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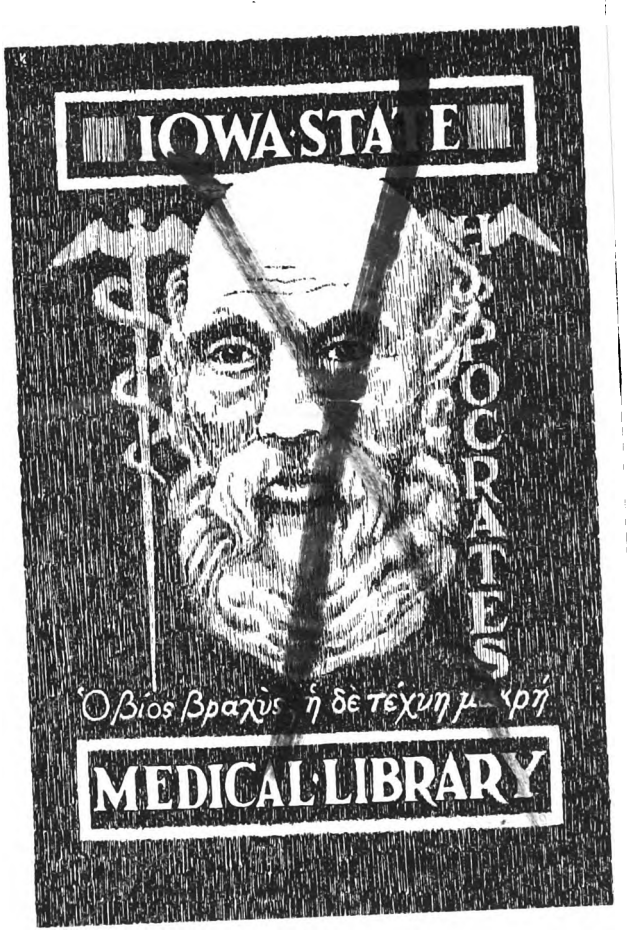

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ASSISTANT EDITOR

E. CLAYTON-JONES, M.B.

PUBLISHED BY

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LONDON AND AYLESBURY

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A JOURNAL OF BRITISH AND FOREIGN MEDICINE, SURGERY, OBSTETRICS, PHYSIOLOGY, PATHOLOGY, PHARMACOLOGY, PUBLIC HEALTH, AND NEWS

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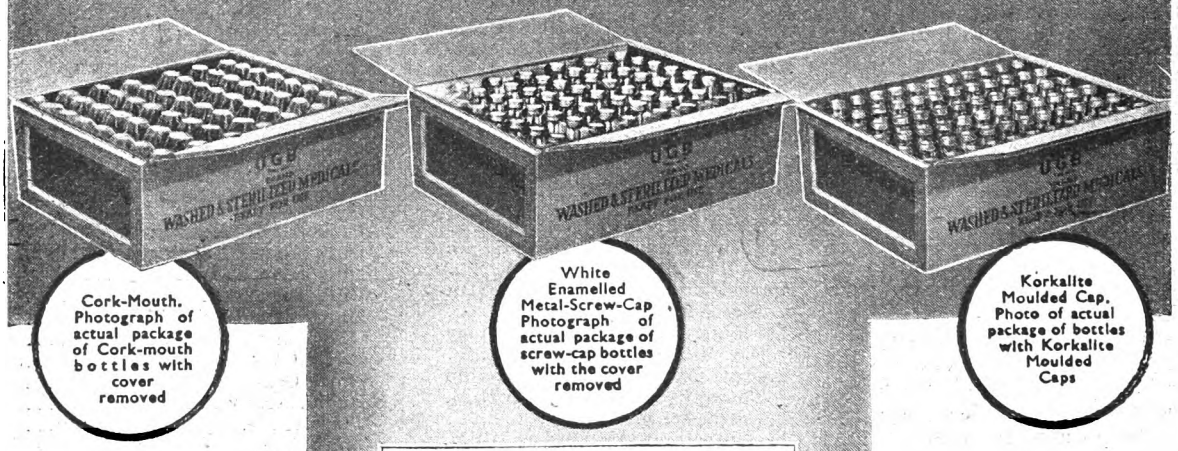

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Heparin in Prevention of Frostbite Gangrene

Experimental frostbite has been introduced in rabbits and humans by application of solid carbon dioxide for varying degrees of time. Initial research involved injection of fluorescein intravenously, and examination under ultra-violet light to determine migration of material through the blood stream and into interstitial space. Heparin was injected after exposure, and although control cases developed gangrene and lost exposed extremities, there was no deep damage in treated cases. One patient, who had been lying in a street at sub-freezing temperature for at least 14 hours, was satisfactorily treated according to this new method. (*J.A.M.A.*, 1945, *129*, 279.) [Heparin is made available by Roche under the trade-name 'Liquemin.']

Riboflavine Deficiency and Glossitis

Stomatitis of a special type without skin changes and with no other local cause was observed in a North African camp. Evidence of riboflavine deficiency was based on the results of calculation of the riboflavine content of the diet, and on the observed prompt recovery after giving 10 mg. of vitamin B_2 daily, while nicotinic acid was ineffective. Observations on 8 patients, of Fouad I Hospital, showing similar symptoms were made. From 200–300 mg. of nicotinic acid were given daily by intramuscular injection to 7 patients; 10 to 12 mg. daily of riboflavine were given to 1 patient from the start, and later to another 3 who did not respond to nicotinic acid. Results showed that in some cases this type of glossitis may be improved by nicotinic acid, in others by riboflavine, while in others it responds to neither. (*The Lancet*, 1945, ii, 352.)

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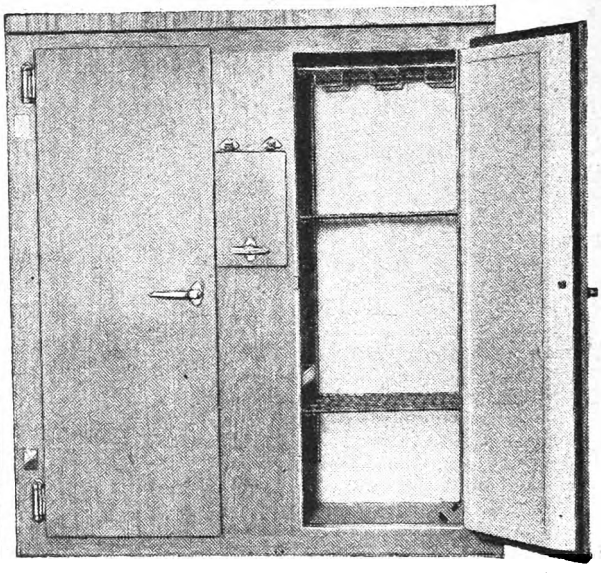

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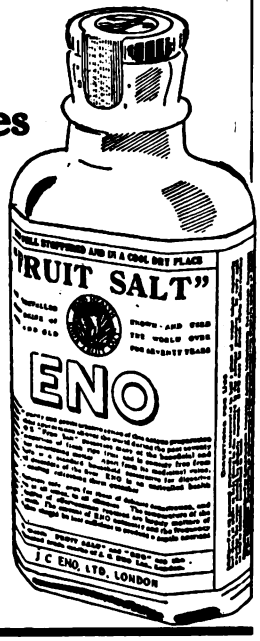

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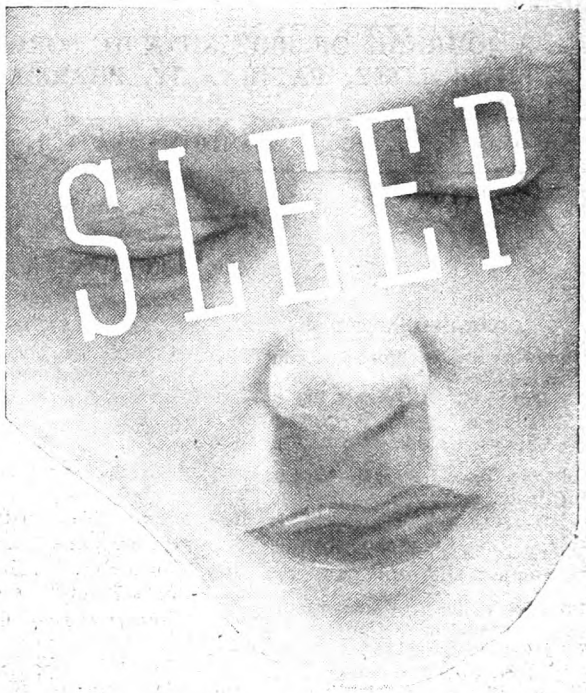

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No. 6395 LONDON: SATURDAY, MARCH 23, 1946 CCL

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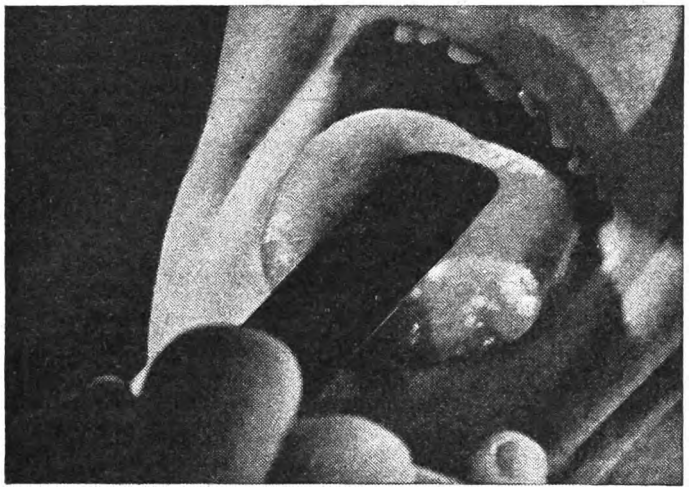

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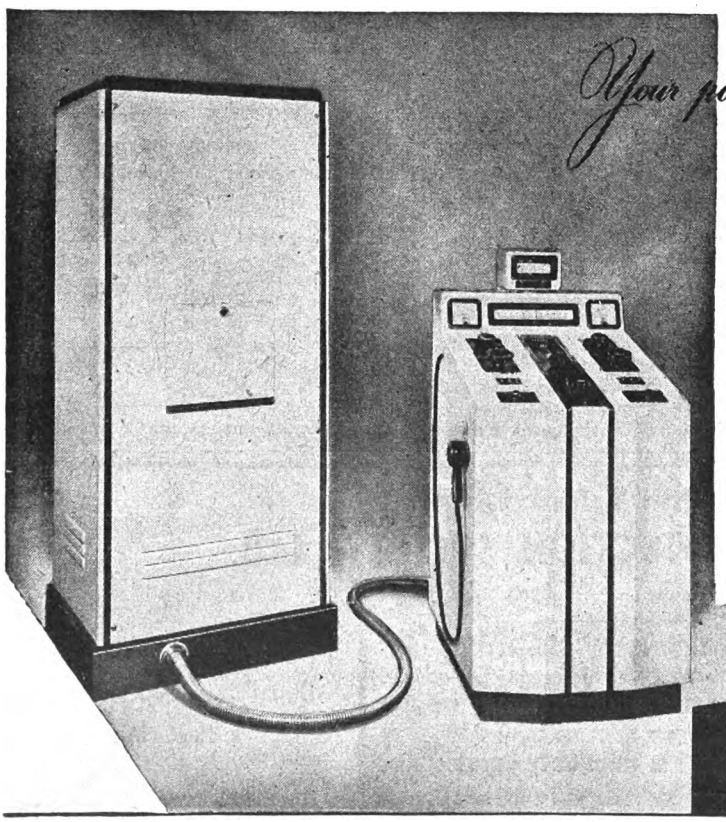

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No. 6396 LONDON: SATURDAY, MARCH 30, 1946 CCL

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PROGNOSIS AND THE PATIENT *

LESLIE COLE
M.D. Camb., F.R.C.P.
HON. PHYSICIAN TO ADDENBROOKE'S HOSPITAL, CAMBRIDGE

MOST patients who are ill want an answer to three questions: Shall I get quite well? How soon will this happen? If I cannot recover completely what will be the limits of my activity in the future?

There are often reservations in asking and answering these questions. The patient may shrink from putting his hopes and fears to the test; the doctor may not want to commit himself more than he need. Constraint on both sides is natural; but the doctor should realise that the three questions are likely to be in the patient's mind, and should prepare himself to answer them as soon as and as fully as he reasonably can. To frame answers is to reach the goal of much scientific thought and method; for in prognosis we see the combination of scientific knowledge and human understanding—the quintescence of years of study of medicine and people, reduced to what the patient wants to know in terms he can understand. This goal is hard to reach, because its attainment demands ability both to solve the scientific problems of medicine and to interpret the solutions wisely to people in every walk of life. One of the great difficulties confronting medical education is to produce doctors who are efficient in both these spheres.

It is true that for many patients, even when all possible clinical and laboratory data have been obtained, the prognosis is too vague to justify an emphatic pronouncement; and it is better to be non-committal than to box the compass of probabilities and possibilities. In others the prognosis is so bad that it would be cruel, except in rare circumstances, to be anything but reserved. But after eliminating all cases in which the prognosis is too uncertain or too serious to help the patient, there remain many in which it is sufficiently definite and encouraging to be passed on. The doctor should aim at making the greatest practical use of prognosis in this third group.

In so doing we have to remember three things:

1. Any illness brings with it anxiety in some degree. The amount of anxiety may depend more on the patient's temperament and environment than on the seriousness of his condition.
2. Uncertainty increases this anxiety.
3. To give a bad prognosis to the patient almost always does more harm than good.

In giving a prognosis therefore one should be as definite and encouraging as possible. I do not, of course, suggest unbridled optimism; for any success this brings is unlikely to last long, and the patient may find it hard to get out of the succeeding slough of depression. But wherever a definite and encouraging prognosis can be given the patient should have the benefit of it.

REACHING A PROGNOSIS

Textbook accounts of the prognosis of a particular disease are usually based on statistical studies, and the views of others, coloured by the author's own experience. The result is very different from the prognosis to an individual expressed at the bedside. Here the syndrome presented may not fit into any textbook classification; and even if it does it is modified by constitution, idiosyncrasy, and concurrent disease, and by environmental stresses and strains. The newly qualified doctor, having made a diagnosis, must base his prognosis largely on what he has read; but the older physician can allow for the complex modifying influences he has observed in other patients down the years. The prognostic possibilities in a disease like subacute rheumatism cannot be fully appreciated without years of experience—years in which the little girl whose heart seemed to be crippled beyond hope has been seen to grow up, and bear children, and yet retain a fair measure of compensation.

An accurate prognosis depends first, however, on an accurate diagnosis. What is needed is not so much the choosing of the correct word-label as a clear conception of the natural history of the disease and the stage it has reached in the patient. Once this is established, a rough gauge of the possible trend of events can be found in a textbook. But the patient in his environment is the soil which nourishes the disease, and the qualities of both patient and environment must be studied as carefully as the signs of the disease itself. The patient is seen in the light of his family history, his response to disease in the past, and what is known and observed of his temperament. A picture of his environment is obtained from information given by himself and his relatives and friends, and by direct observation if he is visited at home.

In the final summing up, all three factors—the patient, the environment, and the disease—have to be weighed.

With some patients, the environment is so full of distractions that the whole picture is blurred. When this is so, removal to a standardised environment in a hospital or nursing-home may be a great help. Quite apart from the fact that investigations can be done there which cannot be done at home, removal enables simple clinical observations to be made under known conditions. Accurate records of temperature, pulse-rate both awake and sleeping, bowel action, urinary output, appetite, sleep, and the amount of urine passed on a known diet, may when other evidence is equivocal provide decisive clues to diagnosis and prognosis. One of the big advantages of special and complicated investigations is that they give one an acceptable excuse for moving patients to a hospital where they can be studied as it were in vitro.

FAMILY HISTORY

Just as in a picture the significance of the background is inversely proportional to the prominence and vigour of the central theme, so family history is related to prognosis. Thus in a patient with advanced malignant disease of the stomach the family history is unimportant. But when the clinical picture is vague the family history may have considerable prognostic bearing.

Two men of 55 who were leading strenuous lives were anxious about their hearts. Both complained of pains in the chest but had no other symptoms. On examination, the only differences between them were that the first had a slightly plethoric appearance and his blood-pressure was 150/90, while the second looked fit and his blood-pressure was 145/80. Both their hearts were normal radiologically and their electrocardiograms were also normal.

The first man, however, gave a family history of sudden death from cerebral or coronary accidents in seven near relatives; his grandfather, an aunt, and an uncle on his father's side, all between 60 and 70, his father at 47, one sister at 35, and two brothers at 28 and 30. In contrast the second patient's father and mother and three grandparents had lived to be over 80, and his other grandparent to 75, while most of his great-grandparents were also very long-lived. These facts meant that the prognosis in the two cases was different.

Rheumatism in various forms is another example of disease which tends to afflict some families more than others and in which the family history may help to determine the seriousness of the symptoms.

A woman of 43 had had severe and increasing pain in the back and shoulders for a year with no other definite clinical signs. The fact that her father was crippled with "arthritis" at the age of 47, and an aunt and a sister both had severe "rheumatoid arthritis," was a prognostic red light.

Sometimes there is a pronounced background of ill health in a family which is a general rather than a specific warning.

* Companion papers on Treatment and on Diagnosis have already appeared in THE LANCET, 1943, i, 163; 1943, ii, 561.

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For example, a little girl of 3 appeared to have early cœliac disease. On inquiry it was found that her maternal grandmother had suffered from spasmodic asthma and her father from migraine; a paternal uncle had had a limb amputated for Buerger's disease, a sister had epileptic attacks, and a first cousin on her father's side had died as a child from malignant disease of the kidney.

When a careful family history is systematically taken, it is surprising how often facts will crop up which have a bearing on both diagnosis and prognosis in a difficult case. It must be emphasised, however, that such evidence is mainly of secondary importance.

PROGNOSIS IN SPECIAL DISEASE GROUPS

Prognosis is required where the bodily powers of a patient are affected by functional and organic disorders. Although these disorders often do not fit textbook descriptions of disease, there are many which do. Of the latter, certain fairly well-defined groups are worth commenting on separately. The divisions between these groups are arbitrary and patients might often be placed in more than one of them.

1. *Acute infection with specific treatment* (diphtheria, lobar pneumonia, cerebrospinal fever, staphylococcal septicæmia).—Here the prognosis depends firstly on the speed and efficiency with which the specific treatment is applied, or, if it has already been applied, on the signs indicating response.

2. *Acute infections without specific treatment* (acute anterior poliomyelitis, typhoid fever, mumps).—Here prognosis depends on knowledge of the natural history of the disease, and especially the limits of variability, rather than on knowledge of the typical case. Knowledge of possibilities, even though rather remote, will often leave a loophole for hope and encouragement. One of the most striking features of a severe epidemic of infantile paralysis is the extreme variation not only in initial paralysis in patients with similar symptoms but also in the degree to which established paralysis recovers and its rate of doing so.

Two children in the same family had exactly similar symptoms and signs at onset, and the changes in their cerebrospinal fluids were almost identical. The first was grossly and permanently paralysed in all four limbs and trunk, and remained a cripple; the second did not develop any paralysis at all.

3. *Chronic disease with specific treatment* (diabetes, pernicious anæmia, myxœdema).—Here, apart from environmental and temperamental factors, confirmation of response to specific treatment and the presence or absence of intercurrent disease are the chief considerations which may modify the textbook prognosis. Thus, in the elderly diabetic the prognosis depends not so much on the severity of the diabetes as on the condition of the cardiovascular system. Sometimes patients who appear to have typical pernicious anæmia fail to give the expected response to liver therapy, thus entirely altering the prognosis. When it is known that such anomalies exist, it is wise when giving a good prognosis to make a reservation about response to treatment, until the therapeutic response has been proved. I was once confronted by a typical case of myxœdema in which an optimistic prognosis proved wrong because the exhibition of thyroid caused immediate anginal symptoms.

4. *Chronic diseases liable to natural remissions* (disseminated schlerosis, rheumatoid arthritis, lymphatic leukemia).—There are many chronic diseases which progress by a series of remissions and relapses, and the prognosis given is apt to vary according to whether the patient is seen on the crest or in the trough. The best guide is obtained by careful study of progress in the past, for this will often indicate the particular phase which has been reached. When a disease like disseminated sclerosis is seen during the first attack, prognosis is necessarily guarded, but it is a mistake to be very gloomy until the frequency and severity of subsequent attacks have shown how it is likely to progress. All disability may disappear for a time and there may be years of health and activity ahead.

5. *Acute disease superimposed on chronic disease.*—Sometimes during the course of chronic disease an additional acute disease develops. When this happens, it may be extremely difficult to assess the disability from each. There is a natural tendency to assume that the chronic process is wholly responsible, with the result that the prognosis given is unduly bad, since the potentialities of recovery in a chronic process are usually less than in an acute one. Examples of this are acute pneumonia in the course of lung disease, acute nephritis in the course of chronic nephritis, or coronary thrombosis in chronic myocardial disease. Careful study, particularly of the history, will sometimes prevent mistakes thus caused.

PROGNOSIS IN SICK COLLEAGUES

Some of the most difficult prognostic problems arise in looking after sick colleagues. It is the lot of some doctors to watch with clear faculties their own death approaching, with certainty which only their own experience can give. But these are mercifully few, whereas many are a prey to anxieties of their own making which arise because of their medical knowledge. All that can be said is that many of their fears and anticipations are groundless and can be allayed by early recognition and frank explanation. It should be a constant aim to be aware of these fears and to be on guard against doing or saying anything which can cause them.

During the worst stages of many severe illnesses the faculties are commonly clouded and symptoms lose their significance even to the trained medical mind, so that a sick doctor can be given comfort when scientifically there is very little hope. Often the very darkness of a background helps to throw into relief slight reasons for encouragement. That sensation is blunted and the image blurred should be remembered.

PROGNOSIS AND POSITIVE HEALTH

In history-taking it is often not difficult to trace backwards the sequence of pathological and environmental processes which have led to gross organic disease, and confirmation that a particular train of events has led to death is often found in the post-mortem room.

Prognosis in its widest sense is the reversal of this process. From a single uncorrected deviation from normal it may be possible to foretell a series of probable effects, especially when for the family doctor it is combined with a knowledge of the patient's family history, occupation, environment, past history, and temperament. If, for example, the prognostic possibilities of undernutrition and overnutrition, postural and breathing defects, slight indigestion, recurrent nose and throat infections, oral sepsis, dental insufficiency, and mild anxieties were recognised in the early stages, and if these conditions were treated by eradicating the cause or applying appropriate corrective measures, a great deal of disabling illness, especially in those over forty, would disappear and active lives would be prolonged. With the consequent improvement in the general level of health other more serious and less obviously connected diseases would probably tend to diminish too.

There is nothing new in the idea that prevention is better than cure, but in some medical practice the recognition of this truth is still mainly passive. "Positive health" is a term coined to express an attitude in which doctors are as actively concerned in the maintenance of health as in the treatment of established disease. In action this would mean a change of approach to the patient—especially by those in general practice, who see the patient for the first time and often have the chance to spot trivial disorders and more serious disease

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in its early stages. One of the main features of this change would have to be increased interest in the prognosis of slight disorders of structure and function.

To bring about this change of approach it is first necessary to rouse in the student and newly qualified doctor a lively interest in the immediate and remote prognosis of slight disorders so that he will learn automatically to picture them, not as isolated entities, but as links in a chain of functional and pathological changes between health and gross disease. Once this interest is aroused, he will soon realise that the dyspepsia or the limp for which no "organic" cause can be found is at least as interesting as the active ulcer or the diseased hip-joint, and abdominal "lumps" and cardiac murmurs will be seen in their proper perspective.

There is one further aspect of prognosis which with the technical development of medicine is becoming more important, and that is the necessity to explain away as soon as possible positive findings which do not indicate disease.

Almost every technical advance in medicine has made it possible to demonstrate fresh variations within the limits of normal which would previously have passed unnoticed. The stethoscope revealed the benign systolic murmur, the sphygmomanometer the slight degree of hypertension, X rays the dropped stomach. Almost any special test may show some previously undetected sign which experience proves to have no prognostic significance. It is becoming an increasingly important part of prognosis to see that if the patient has been allowed to get wind of such findings, their lack of any sinister implication is at once explained to him. If this is not done, one result of the present zeal for early diagnosis and prevention—as for example by mass radiography and universal instruction about venereal disease—may be a good deal of unnecessary suffering and loss of efficiency.

CONCLUSION

My excuse for this sequence of platitudes is that many people today carry unnecessary burdens of anxiety about their health which limit their happiness and activity, and that they bear these burdens for lack of the reassurance which could have been given without delay.

Failure to give a prognosis when it can be good or reasonably good is one of the major sins of omission. The consideration of prognosis should be foremost in a doctor's mind, not only because it is a stimulating academic exercise but also because to give a prognosis—with any necessary reservations—is an essential step towards managing and treating the patient as well as possible.

A TRANSMISSIBLE DISEASE IN RATS
INOCULATED WITH MATERIAL FROM CASES OF INFECTIVE HEPATITIS *

F. O. MACCALLUM, M.D., B.Sc. Toronto
J. A. R. MILES, M.B. Camb., CAPTAIN R.A.M.C.

From the Wellcome Laboratories of Tropical Medicine

A CONSIDERABLE amount of information concerning infective hepatitis, homologous serum hepatitis, and post-arsenotherapy hepatitis has been obtained in recent years by experiments on human volunteers. There is however no doubt that more complete knowledge could be more readily obtained if a susceptible animal was available for experimental purposes. Successful transmission of infective hepatitis to pigs, guineapigs, mice, canaries, and chick embryos has been reported recently by Scandinavian, Dutch, and German workers, and G. M. Findlay has recorded from West Africa the production of liver necrosis in two cercopithecus monkeys which received injections of neoarsphenamine and icterogenic serum; but experiments in other laboratories have so far failed to confirm these results.

All our attempts to transmit these three types of hepatitis to the usual laboratory animals have to date been unsuccessful. We have also failed in experiments where an attempt has been made to lower the resistance of the animal by exposure to X rays, splenectomy, injections of various arsenicals, injections of alloxan, and infections with certain bacteria.

Suggestive results have however been obtained in white rats fed on a diet deficient in some essential amino-acids. It has already been shown that necrosis of the liver can be produced in some strains of rats by feeding them on diets deficient in certain essential amino-acids, and that by varying the constituents of the diet the rapidity of production and severity of the lesions can be controlled. As a result of their experiments Himsworth and Glynn provided us with the formula for a diet which produced a few microscopic lesions in the livers of 9% of rats fed on it for about 60 days. It was hoped that by means of this diet the resistance of the rats might be sufficiently reduced to make them susceptible to the agent of infective hepatitis without complicating the picture by purely dietary lesions and deaths. Each rat received 8 g. daily of the diet, which consisted of dried brewers' yeast 16%, casein 4%, corn starch 71%, cod-liver oil 1%, arachis oil 5%, and salt mixture 3%; plus vitamin supplement to supply each rat daily with thiamine hydrochloride 20 μg., riboflavine 25 μg., pyridoxine 20 μg., and calcium pantothenate 120 μg.

* A report to the Medical Research Council.

PRELIMINARY EXPERIMENTS

In the first series of experiments, which was carried out at the Department of Pathology, Cambridge, twelve white rats of the Wistar strain weighing 70 g., which had been on the diet for 60 days, were injected on three successive days with material from cases in an institutional epidemic of infective hepatitis. Nasal washings were instilled intranasally, blood was injected intraperitoneally, fæces were injected into the stomach by catheter, and urine was given in the drinking-bottle. The deficient diet was continued. Blind passages of liver, spleen, and kidney were carried out every 21–28 days, using groups of four to six rats which had been on the diet for 60–120 days. Sterile tissues were pooled, ground in a mortar, and inoculated as 20% suspensions in broth orally and intraperitoneally. Tissues were stored at — 20° C till used. Five passages were carried out before this series was stopped. Ten human volunteers who received oral or subcutaneous injections of the 4th-passage rat material did not develop any signs or symptoms of hepatitis or other illness. None of the rat tissues of this series showed any macroscopic or microscopic lesions. At this stage the work ceased for 6 months.

SUBSEQUENT FINDINGS

The work was resumed 6 months later at the Wellcome Laboratories of Tropical Medicine with rats of the same strain and size and fed on the same diet as previously. The initial group of six rats, which had been on the diet for 40 days, were injected intraperitoneally with 1 c.cm. of whole blood and orally with fæces collected on the first day of jaundice from a single case of infective hepatitis. Two of the rats were killed on the 20th day. Pools of sterile liver, spleen, and kidney were inoculated intraperitoneally into six rats which had been on the special diet for 50 days. These rats also received serum and fæces collected from two cases of infective hepatitis on the first and fourth day of symptoms respectively. In all subsequent passages only organ suspensions were used, and doses of 1 c.cm. were given by mouth and/or intraperitoneally. In the 2nd, 4th, and 6th passages bacterially contaminated tissue suspensions were passed through Seitz EK filters, but in all later passages all suspensions were filtered through a 750 mμ Elford Gradocol membrane.

In this series the rats were kept on the special diet for a much shorter time before inoculation than in the first series. This was purely fortuitous in the first instance, being due to the irregular supply of animals and the desire to pass material as quickly as possible without undue storage. In the 4th–6th passages rats had been on diet only 21–30 days when inoculated, and in the 7th passage for only 7 days. All later passages were carried out in

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DEGREES AND FREQUENCY OF MACROSCOPIC AND MICROSCOPIC LESIONS

Passage	Dilution	No. of rats	Days on diet before inoculation	Survivors 10th day	Killed	Died	Lesions	
							Macroscopic	Microscopic
Original inoculation	1/5	5	40	5	*19, 19, 43, 43, 81	..	..	..
1st passage	1/5	6	50	6	22, 22, 22, 42, 44, 68	..	..	..
2nd ,,	1/5	6	56	6	20, 20, 20, 41, 62	*38	..	..
3rd ,,	1/5	6	92	6	19, 19, 40, 40, 61	15	..	1
4th ,,	1/5	6	21	5	19, 19	15, 39, 41	1, 5	1, 5
5th ,,	1/5	6	21	5	19	15, 16, 21, 21	3, 4	1, 3, 4
6th ,,	1/5	6	21	4	18, 20, 20	53	3, 4	1, 3, 4
7th ,,	1/5000	7	7	6	..	14, 15, 16, 16, 23, 48	1, 3, 5	1, 2, 3, 5
8th ,,	1/5000	12	15	9	..	17, 25, 27, 27, 30, 32, 32	3, 4, 5	1, 3, 4, 5
,, ,,	1/50,000	11	15	10	..	11, 20, 46	1, 3, 4, 5	1, 2, 3, 4, 5
9th ,,	1/10	6	7	6	21	20, 21, 21, 33	1, 3	1, 2, 3
,, ,,	1/50	6	7	3	..	30, 32, 42	3, 5	1, 2, 3, 5
,, ,,	1/500	11	7	8	..	14, 20, 21, 30, 36, 36, 36, 50	1, 3, 4, 5	1, 2, 3, 4, 5
,, ,,	1/5000	4	7	4	..	21, 30, 32, 37	1, 3	1, 2, 3
,, ,,	1/500,000	5	7	5	..	18, 61	..	..
,, ,,	1/50,000,000	5	7	5	..	45	..	..

* refers to number of days after inoculation.
2nd, 4th, 6th passages are Seitz EK filtrates. 7th, 8th, 9th passages are 750 mμ Elford Gradocol membrane filtrate.
Nos. 1, 2, 3, 4, 5 under "Lesions" refer to liver, spleen, lymph-glands, stomach and/or intestine, and lung respectively, and indicate the site of lesions occurring in each group.

rats which had been on diet 7–21 days, since this yielded satisfactory results. Animals of the 1st, 2nd, 3rd, 4th, 5th, and 6th passages were killed on the 16th to 21st day for passage. In subsequent passages tissues from animals moribund or dead with specific lesions on the 12th–21st day were used.

Considerable trouble was encountered in the stocks of rats, which were supplied from two sources. Those from one breeder often had lung abscesses, and some of those from the other had *B. morgani* infections. The pathogenicity of *B. morgani* for rats on the deficient diet is being investigated. In none of these rats did lesions appear similar to those described below. Some of the rats on the diet died before they were inoculated, and a few died after they had been injected, particularly in the first week after inoculation, with no apparent macroscopic or microscopic lesions of any organ. Though some of the deaths may have been acute deaths due to the disease described below, only deaths ten days or more after inoculation have been considered in this report.

There were no abnormal signs or symptoms or macroscopic or microscopic lesions in either the six original rats or the six of the first passage. All six rats of the 2nd passage showed loss of appetite 20–25 days after inoculation but no apparent histological changes. In the 3rd passage all rats looked poorly 15–18 days after inoculation, and in all further passages loss of appetite, roughening of the fur, and sluggishness were symptoms common to all the sick animals. The results of passage on virulence up to the 9th passage and over a period of 7 months can be seen in the accompanying table. Further passages since that time have shown little variation.

The first histological abnormalities were seen in microscopical examination of the liver of rats of the 3rd passage killed on the 19th and 40th days after inoculation and after 111 and 132 days on diet. The findings included loss of definition of the columns of parenchymal cells, small collections of inflammatory cells, mainly in the portal tracts, vacuolation of nuclei, and definite margination of the chromatin. Macroscopic necrosis of the liver was first present at the 4th passage. It occurred in two rats 39 and 41 days after inoculation and after 60 and 62 days on the diet. In one of these two rats there was also massive hæmorrhage in the lungs, and in the other there was hæmorrhage in the mesenteric lymph-glands. Submucous hæmorrhages in the stomach were first seen in a rat of the 5th passage. These macroscopic and microscopic changes of liver, lung, lymph-glands, stomach, and intestine and microscopical evidence of inflammatory changes in the spleen appeared in varying degrees and frequency from then onwards in future passages, as shown in the table.

Beginning at the 8th passage, inoculations were also made in rats on a 6% casein diet. Though gross necrosis of liver was not seen in such rats until the 4th passage, macroscopic lesions in lymph-glands and stomach and microscopic changes in the liver and spleen were present at 1st passage and were produced as frequently and after the same intervals as in the rats on the 4% casein diet.

Passage has been successful by either the oral or the parenteral route, but for most passages both routes have been used. Passage has been successful with suspensions of liver, spleen, lymph-gland, and kidney; other organs and excreta are being tested.

An attempt to produce lesions in six rats placed on the special diet at the same time as they were receiving 3rd-passage material with no preparatory deficient diet was unsuccessful, as was inoculation of six rats which had been on 4% casein diet for 12 days and were placed on normal diet after receiving 9th-passage material. Lesions have not been produced as yet in nine normal rats of the same weight fed on a normal diet throughout the experiment. Successful passage has not been obtained as yet in baby rats, mice, or guineapigs. After two passages through chick embryos inoculated into allantois and yolk sacs, pools of embryos and membranes did not produce lesions in rats on 4% casein diet.

As control, a group of six rats of the same strain and weight on a 4% casein diet were inoculated with normal human serum and fæces. Using groups of four to six rats, 9 passages of liver, spleen, kidney, and lymph-glands involving fifty rats have been carried out at 19–21 day intervals in the same manner as those started on human hepatitis material. Though occasional non-specific deaths have taken place, no lesions similar to those described above have been seen.

A neutralisation test, using the convalescent sera of the patients supplying the original material, though not entirely satisfactory, gave suggestive results.

In a preliminary filtration carried out with the help of Dr. W. J. Elford, typical macroscopic and microscopic lesions were produced after 18 days in one of four rats inoculated with a filtrate of a 63 mμ Elford Gradocol membrane, the smallest average pore diameter tested.

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DELIMITATION OF SUBCORTICAL TUMOURS BY DIRECT ELECTROGRAPHY

W. GREY WALTER M.A. Camb.
V. J. DOVEY M.S.R.

From the Burden Neurological Institute, Bristol

FOR nearly ten years indirect electro-encephalography has been used as an aid to location of cerebral tumours (Walter 1936, 1937, Williams and Gibbs 1939, Krynauw 1939, Cobb 1944). The results and implications of routine indirect recording, with electrodes on the scalp, have been confirmed by direct exploration of the brain exposed during surgical operations (Foerster and Altenburger 1935, Walter 1936, 1937, Schwartz and Kerr 1940, Scarff and Rahm 1941).

These studies all agree in concluding that a space-occupying lesion has two effects on the electrical activity of the brain. There is, first, the indirect action which may be due to œdema, vascular changes, or a more subtle metabolic upset, leading to the production of very slow potential changes at 0·5–3 cycles per sec., the " delta waves " by which location is usually achieved in indirect electro-encephalography. Secondly, there is the direct substitution of new growth for nervous tissue, with the result that all electrical activity disappears entirely. The space-occupying lesion, tumour, abscess, or hæmatoma, is quite inert electrically. In cases with very large superficial tumours this area of electrical inactivity can sometimes be detected in indirect records. The differences between normal brain in any area, abnormal brain, and inert tissue are very striking when the cortex is explored directly, and the extent of a superficial lesion may be precisely defined by this means.

Often enough, even after location of a lesion by neurological examination, E.E.G., and air replacement, exposure of the cortex may reveal nothing, and the surgeon must resort to needling of the subcortical tissue. In this he relies on his sense of touch and pressure and on the chance of withdrawing from the tumour a small quantity of material for biopsy or analysis. If the lesion has the same consistency as brain, needling may be of no avail and in any case is inadequate to delimit the extent of the lesion.

TECHNIQUE

To supplement the subjective method, a needle electrode has been made with which the electrical activity of the subcortical structures may be recorded. The construction of this electrode is shown in fig. 1. The basis is a hollow silver brain-needle. Over this is drawn a thin transparent plastic insulating sleeve, leaving only the tip bare. Down the bore is passed a gauge-30 silver wire, also insulated in fine-bore plastic sleeving. The end of this wire is brought out through the side opening of the needle and turned down over the plastic sleeve. The various joins and openings are then soaked in plastic cement, leads are soldered to the needle and inner wire, and the contact surfaces are chlorided by electrolysis.

This last process has been found to be of the greatest importance. If the needle-tip and side-contact are left bright, the system is extremely sensitive to streaming potentials, concentration potentials, and other sources of irrelevant potential changes. This means that, when the electrode is inserted into the brain, pulse artefacts and the like are excessively prominent, and the movement of the needle between successive recordings sets up very large and protracted potential surges.

When the surfaces are chlorided, however, the electrode can be agitated violently in saline solution without producing any potentials of the order of size of those generated by nervous tissue. When it is in the brain, perceptible movements or pulsation can take place without producing any spurious potentials. The electrochemical explanation of this effect need not be gone into here in detail. It depends on the properties of the insoluble silver chloride in contact with an electrolyte containing excess of Cl' ions (Dole 1935, Butler 1940).

The electrode and leads are sterilised either in alcohol or in formalin vapour. They cannot be boiled. The needle is marked in centimetres up to 6 cm.

A special two-channel portable amplifier and ink-writing recorder has been constructed for this type of work and will be described elsewhere (Brooks and Walter 1945). The circuit incorporates special devices to eliminate blocking of the amplifiers by large surges of potential, so that the electrode can be moved in the brain during a recording. There is also a special optical projection device to permit the surgeons to see the record and the operating field simultaneously.

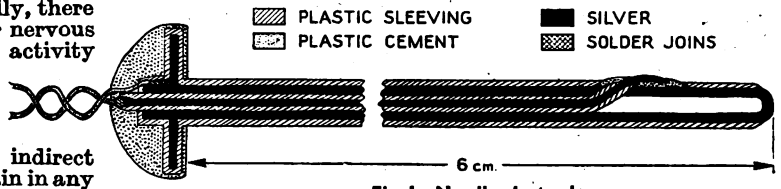

Fig. 1—Needle electrode.

The following procedure is used for recording during operations:

(1) The diathermy apparatus, suction pump, electric drills, and the like are disconnected from the mains.

(2) The operating-table and the leads to the diathermy leg pad and to the surgeon's diathermy electrode are connected to the earthed screen of the amplifier input leads.

(3) The exploring electrode is removed from alcohol and rinsed in sterile saline by the surgeon, who then passes the end of the electrode leads to an assistant. This end of the leads is now " dirty " and is clipped to an ' Anglepoise ' standard.

(4) The surgeon places the electrode in a bowl of sterile normal saline.

(5) At the same time, both electrode leads are connected to the positive terminal of the low-tension accumulator in the amplifier.

(6) The surgeon dips his diathermy electrode in the bowl of saline.

The earthing procedure eliminates interference from mains hum and movements by the patient. The anglepoise standard helps to immobilise the electrode leads in the desired positions. The procedure in (4), (5), and (6) is to ensure that a fresh film of silver chloride is present on the electrode surfaces. The diathermy electrode, being earthed, is connected to the negative pole of the accumulator, thus completing the electrolysis circuit.

The electrode, being insulated except at the tip and side contact, picks up potential changes only from the tissues adjacent to these points, which are slightly less than 1 cm. apart. The needle is used by the surgeon like an ordinary brain-needle, except that at every centimetre of depth a halt is made for a few seconds' recording. Differences of consistency can of course still be appreciated.

RESULTS

The results have been clear and consistent. The appearance of the records depends on whether or not a general anæsthetic is being used. With no general anæsthetic, normal local rhythms are easily recognised even at considerable depths. The alpha rhythm, for example, has been identified 3–5 cm. below the parieto-occipital cortex, where it is still responsive to opening and closing the eyes. In other areas more complex rhythms and wave-forms are seen. The potentials are

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DR. MACCALLUM, CAPT. MILES : SUMMARY

The inoculation of blood and fæces from patients with infective hepatitis into rats on a protein-deficient diet, followed by blind passage of the tissues of these rats, has led to the production of necrosis of the liver, enlargement and/or hæmorrhage of lymph-glands, hæmorrhage in stomach and/or intestine, and hæmorrhages in the lung.

Passage, titration, neutralisation, and filtration experiments suggest that this is a transmissible disease caused by a virus.

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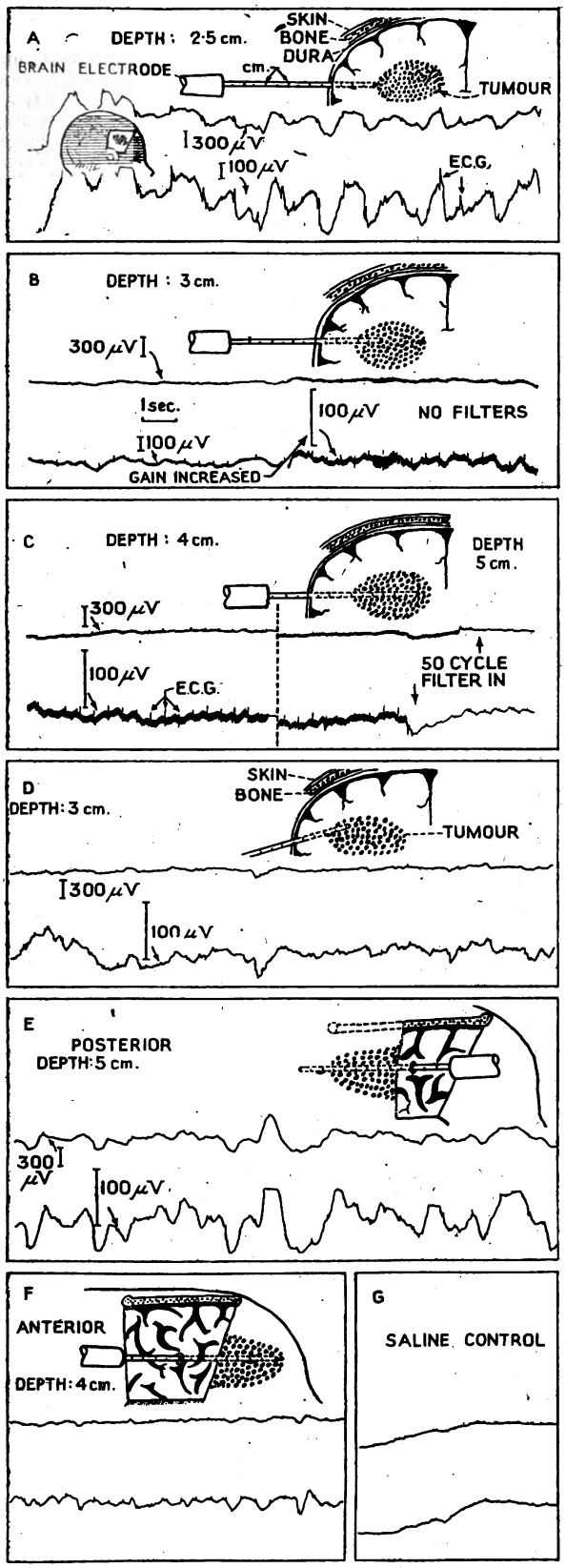

Fig. 2—Electrographic record in case 1, with electrocardiogram superimposed as check against pulsation artefacts: A, large slow delta waves indicating disturbed white matter; B, electrode in electrically inert tissue at depth of 3 cm.; C, electrode still in inert zone at 4 cm.; D, electrode inserted upwards, a few rhythmic potential changes visible; E, electrode, inserted towards back of head, has passed through inert zone and emerged into active abnormal white matter, thus delimiting inert zone; F, electrode inserted towards frontal region and still in inert zone; G, control record, electrode stirring normal saline, showing only slow drift of potential.

usually upwards of 100 μV. In light ether anæsthesia there is less local variation between areas; all show an alpha-like rhythm even in the deeper layers. This is not appreciably affected by stimuli. During deeper anæsthesia large slow waves appear, as in indirect leads, again from deep as well as superficial tissue.

The range of frequencies and wave-forms from white matter appears much the same as that seen in indirect E.E.Gs. and generally regarded as characteristic of the cortex.

Discrimination between normal and abnormal nervous tissue is difficult with a general anæsthetic, but in unanæsthetised brain the approach to a pathological region is easily detected by an increase in the slower components, which become extremely large just before the electrode enters the space-occupying lesion.

Both with and without anæsthesia the difference between nervous tissue and anything else is sharp and clear. The moment the electrode enters a tumour, abscess, hæmatoma, or a ventricle, electrical activity becomes minimal. It reappears when the electrode emerges on the far side of a lesion. Electrical exploration in three dimensions can be carried out to establish the limits of the abnormal or aneural zone.

These points may be illustrated by describing four cases in greater detail.

CASE 1.—A woman, aged 25, with a history of increasing frontal headaches and drowsiness for a year. Six weeks before admission she began to vomit frequently and became giddy on standing. Examination showed bilateral papilloedema, absent knee- and arm-jerks, bilateral extensor plantar reflex, normal sensation. No ataxia. The cerebrospinal-fluid (C.S.F.) pressure was high, but its composition was normal. Neck rigidity became well-marked, and abdominal reflexes disappeared. There were no satisfactory localising signs. The patient was semiconscious; hence a complete neurological examination was impossible.

The indirect E.E.G. showed a large slow delta discharge in the right frontal region and moderate potential theta activity from most of the right hemisphere. This indicated a lesion involving the subcortical structures in the right fronto-temporal region (Walter and Dovey 1944, Cobb 1944).

Under a local anæsthetic a burr hole was made in the right frontal region by Mr. P. B. Ryan, the dura opened, and the brain needled for biopsy. At a depth of 4 cm. a cyst containing 7 c.cm. of yellow fluid was entered; the brain here was resistant. A smaller cyst was tapped at a depth of 3 cm.

The following day a right frontal flap was turned down under a local anæsthetic. The dura was tense. Through a small incision the exploring electrode was inserted at right angles to the surface (fig. 2 A). At 1–3 cm. the record showed large slow delta waves indicating disturbed white matter. To provide a check against pulsation artefacts, the electrocardiogram was superimposed on the records and is seen as indicated in the figure. The large slow waves bear no relation to the pulse-rate. Both amplifier channels were connected to the electrode, but the top one was set at low and the bottom one at high amplification. In this way the range of resolution can be extended to cover from 10 microvolts to one millivolt. This accentuates the contrast between neural and aneural records, as is seen in fig. 2 B, where the electrode has entered electrically inert tissue at a depth of 3 cm. Even when the amplification is increased threefold in the lower channel, there is only a suggestion of rhythmic activity, and this is scarcely above the "noise level." There is some mains hum from the electrocardiogram injecting circuit; this is filtered out as indicated without affecting other features of the record. In fig. 2 C the electrode is deeper in the inert zone, and again no rhythms are seen. In fig. 2 D the electrode is inserted upwards, and a few rhythmic potential changes are visible. Insertion slightly higher gave large potential changes, whereas insertion slightly lower gave none, from which the dotted outline shown in the figure could be inferred. In E the electrode has been inserted towards the back of the head and after traversing an inert zone has emerged into active but abnormal white matter, giving the limit of the inactive space. In F the electrode has been passed forwards towards the frontal pole and is still in inert tissue.

From these and many other records taken within a few minutes the extent of the aneural zone was inferred, and from the very abnormal activity all round it the probability of a rapidly expanding lesion was suggested. Fig. 2 G shows a control record obtained while a beaker of normal saline was

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being stirred with the electrode. Only a slow drift of potential is seen.

The inert zone appeared to be an elongated ovoid 3 cm. thick and 7 cm. long, reaching up to 3 cm. below the surface. Further operative investigation confirmed this, but only a partial excision was possible, and the patient died some weeks later. The histopathology indicated a glioblastoma multiforme.

CASE 2.—A woman, aged 43, whose illness dated from a fall in the street six weeks before admission, with a complaint of headaches, pain over the left eye, failing memory, increasing drowsiness, and difficulty in speaking. On examination there was aphasia of a mixed type. The C.S.F. was normal in pressure but of high protein content. There was moderate papilloedema. In repose the right side of the face dropped, but active movements showed a well-marked left-sided paresis. There was some ataxia on the whole of the left side. The right leg was slightly weaker than the left.

The indirect E.E.G. showed a large slow delta rhythm in the left temporoparietal region and a moderate potential theta rhythm from both postcentral and temporal areas. This suggested a lesion involving the superficial structures in the left temporoparietal region and extending deeper into the midline basal ganglia. Under a local anæsthetic a left temporoparietal burr hole was made by Mr. P. B. Ryan. The exploring electrode was inserted in various directions.

Just below the surface (fig. 3 A) a mixture of low-voltage normal rhythms and large slow delta waves was found, as in the indirect E.E.G. This picture was retained up to 5 cm. depth, but at 4 cm. the slow rhythms were largest.

At 5 cm. all potentials were smaller, and at 6 cm. smaller still (D), but at no stage was a flat record obtained. When the needle was inserted towards the occipital pole, very large slow waves were seen at all depths, together with normal alpha rhythm, which was slightly responsive to opening and closing the eyes (E). Towards the temporal lobe the slow components were smaller, and there was considerable theta activity (F).

These observations suggested that a solid tumour mass was unlikely in the zones explored, and it was surmised that new growth was infiltrating into the white matter without destroying it. The histopathology of tissue removed from the low-voltage zones was "suggestive of an astrocytoma, possibly from the border of a glioblastoma."

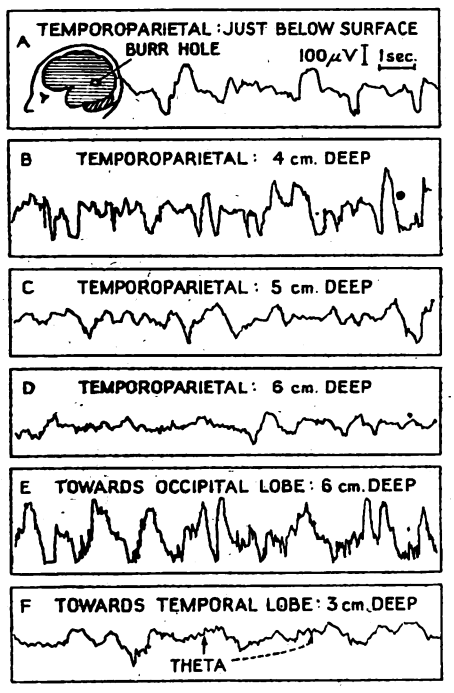
A TEMPOROPARIETAL : JUST BELOW SURFACE
BURR HOLE
100μV
1sec.
B TEMPOROPARIETAL : 4 cm. DEEP
C TEMPOROPARIETAL : 5 cm. DEEP
D TEMPOROPARIETAL : 6 cm. DEEP
E TOWARDS OCCIPITAL LOBE : 6 cm. DEEP
F TOWARDS TEMPORAL LOBE : 3 cm. DEEP
THETA

Fig. 3—Electrographic record in case 2 : A, electrode in temporoparietal region just below the surface, mixed low-voltage normal rhythms and large slow delta waves; B, at 4 cm. deep, slow rhythms largest here; C, at 5 cm., slow rhythms becoming smaller; D, at 6 cm., slow rhythms still smaller; E, electrode inserted towards occiput, mixed waves still ; F, electrode inserted towards temporal lobe, slow waves smaller, and considerable theta activity.

The site of the lesion contra-indicated extensive resection, and the patient died 5 weeks later. Post-mortem examination was refused.

CASE 3.—A woman, aged 48, began to complain of generalised nocturnal fits in July, 1942. She was first seen in July, 1944, when the E.E.G. showed a moderate potential delta focus in the right temporal region suggestive of a space-occupying lesion. There were no neurological signs. A further E.E.G. in September, showed an increase in size and focus of the delta waves.

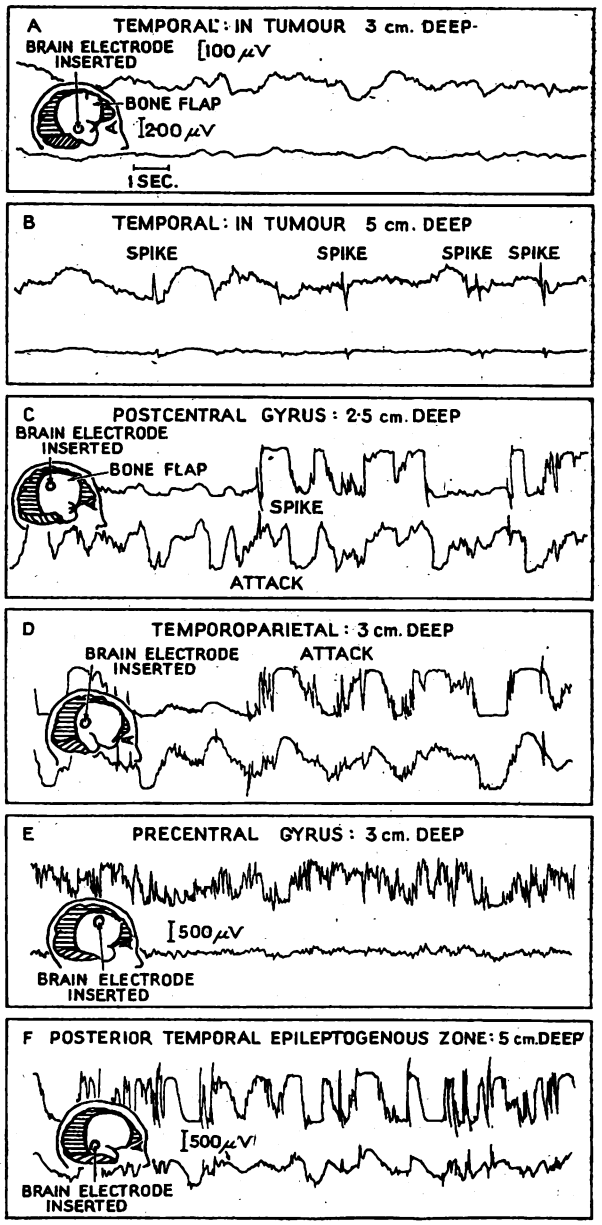

Fig. 4—Electrographic record in case 3 : A, electrode in tumour at 3 cm. deep, absence of spikes ; B, in tumour at 5 cm. deep, spikes preceding seizure ; C, in postcentral gyrus at 2·5 cm. deep, showing spike in relation to seizure ; D, in temporoparietal region at 3 cm. deep ; E, in precentral gyrus at 3 cm. deep, showing complex rhythm typical of this region and absence of spikes ; F, in posterior temporal region at 5 cm. deep, showing spikes.

On admission in December, 1944, the delta rhythm was of high potential and involved parts of the occipital and parietal lobes. There was now theta activity as well and irregularity of the alpha rhythm on the right side. These latter findings suggested that a lesion was expanding into the basal structures as well as the cortex. There were now frequent slight seizures involving the *right* side of the face and *right* arm. There were still no definite localising neurological signs. The E.E.G. suggestion of a right-sided expanding lesion was confirmed by ventriculography.

Under local anæsthesia a right lateral flap was turned down by Miss Kinloch Beck, and the exploring electrode was inserted at various positions. The records are shown in fig. 4. These are reproduced not only to show the flat records, which served again to delimit the aneural zone, but also to illustrate some of the stages in the tracing of seizure pathways, for during the recording the patient was having localised fits involving the left side of the face and left hand. Each seizure was preceded by a series of spike potentials in the temporal lobe. These were seen from a wide area in the

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temporoparietal region and were particularly prominent at greater depths (fig. 4 B and F spike). They were not seen in the tumour itself (A). The precentral gyrus (area 4 of Vogt) did not participate in this activity but continued to exhibit the complex rhythms which seem to be typical of this area (E). Regions posterior to the central gyrus, however, did show seizure spikes (C).

It seems that in this case the lesion was of a particularly irritative type, and that the excitation was conducted from the frontotemporal to the postcentral regions. To study this type of phenomenon more closely it will be necessary to record simultaneously with two or more electrodes. The anterior half of the right temporal lobe was removed. Histopathology indicated a spongioblastoma multiforme.

CASE 4.—A man, aged 64, with a complaint of blindness on the right side and headaches for 5 weeks and of pins-and-needles in the right side of the chest for 2 weeks. On examination there was a right homonymous hemianopia and slight increase in tendon-reflexes on the right side.

The indirect E.E.G. showed theta activity in all areas and bursts of delta waves in the left parietal region. The alpha rhythm was large and unresponsive. These records suggested a left parieto-occipital lesion involving mainly the deeper tissues, including the visual pathways.

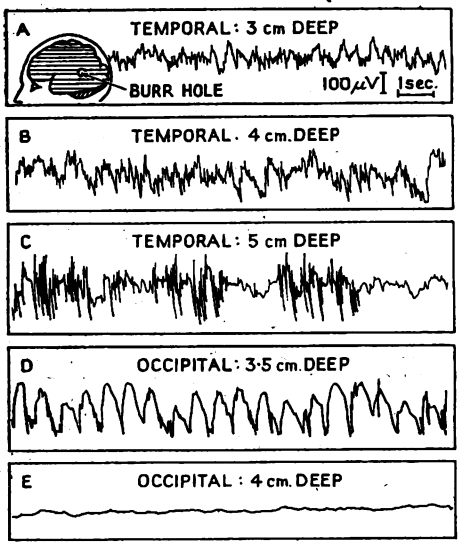

Fig. 5—Electrographic record in case 4 : A, electrode inserted to a depth of 3 cm. in temporal region, normal rhythms at various frequencies, including theta, alpha, and beta waves, with a few slow delta waves superimposed ; B, in temporal region at 4 cm. deep, delta and theta components larger ; C, in temporal region at 5 cm. deep, showing grouped spikes; D, in occipital lobe at 3·5 cm. deep, showing large rhythmic slow waves with occasional superimposed spikes ; E, in occipital lobe at 4 cm. deep, showing sudden change to complete inactivity because electrode has passed into tumour.

Direct records under local anæsthesia were obtained through a burr hole made in the left parietal region by Mr. Ryan. Fig. 5A shows the activity at a depth of 3 cm. towards the temporal lobe. Here there are normal rhythms at various frequencies, including theta, alpha, and beta waves, with a few slow delta waves superimposed. B shows the same features at 4 cm., but the delta and theta components are larger. In C at 5 cm. an area was entered where grouped spikes were the main feature. There were no clinical correlates of these discharges. In D at 3·5 cm. in the occipital lobe very large rhythmic slow waves were found, with occasional spikes superimposed on them, and this zone suddenly changed at 4 cm. to the complete inactivity shown in E, at which point the nervous tissue presumably gave place to new growth, and tissue was withdrawn from this zone for biopsy, which showed tissue suggestive of a disintegrating glioma.

The electrical signs of irritation in the temporal lobe in this case are a puzzling feature, since there was no evidence of any kind of attack.

Delimitation of pathological processes has been successful also in several cases of cerebral abscess. In such cases it is possible to distinguish between inflammation-œdema, irritation, and aneural zones, such as abscess cavities and cysts.

DISCUSSION

Electrical exploration appears to present a promising means of extending knowledge of both physiological and pathological processes in the brain. In clinical application the technique is simple enough for routine use and does not interfere with or supplant the traditional procedures.

Provided that the amplifiers and recorders are trustworthy, robust, and free from blocking delays, the time needed for exploration is only a few minutes. For some purposes a cathode-ray oscilloscope is adequate, but ink-recorders are preferable, since they enable objective successive comparison to be made, and the permanent record is produced automatically.

Simultaneous comparison of two or more zones is desirable. This is the function of the second recording channel, as well as the extension of amplitude range. The design of the exploring electrode is not ideal, and experiments with this are in progress. The needle should be 8 cm. long and more slender. The contacts can be even closer together—3–5 mm.—without losing too much in the apparent amplitude of the potential changes. It would be desirable also for the needle to be fitted with something in the nature of a trochar to permit withdrawal of tissue samples from any zone. A double-barrelled needle might be made fine enough to serve both purposes simultaneously, but a more hopeful design is to make an insulated silver wire the stylet of a fine-bore silver trochar of which all but the tip is insulated. After obtaining a record the stylet-electrode could be withdrawn and tissue sucked into the trochar. The main difficulty is the insulation of the demountable stylet-electrode, but this will be overcome as new materials become available. It is of course essential to reduce to a minimum the amount of damage done to the brain, and this implies designing round the slenderest silver tube which can accommodate a silver wire and insulator of reasonable strength.

Of the several points of general interest in these observations two should receive further careful attention. Normal white matter exhibits rhythmic electrical activity similar to, if not identical with, that generally regarded as characteristic of the cortex above it. This may help to explain why the brain should produce low-frequency rhythms at all. If the process of normal function involves rhythmic loop transmission to and from the cortex in one area and the basal ganglia, or cortex in another area, this transmission may involve a very intricate series of synaptic relays, possibly with amplification by recruitment and facilitation. On returning to the originating cell group such amplified and delayed signals would evoke a fresh set of impulses, and the process would continue rhythmically at an amplitude depending on the number of cell groups involved and a frequency depending on the delays in the loop path. If the normal range of frequencies lies between 5 and 30 cycles per sec., it is not surprising that interference with the basal and intercortical pathways by some lesion has the effect of increasing the delays and reducing the frequencies to those regarded as abnormal. Extension of this very crude hypothesis by further observation and experiment may help to explain other facts—for example, that both in epilepsy and in cases with acquired lesions the slowest rhythms tend to be the largest.

The passive electrical properties of the tissues present in the head may also be worth studying. It would not be surprising if the electrical reactance of new growth were measurably different from that of nervous tissue, since the cell picture is so different, and this might prove a further help in tumour identification. Moreover, the passive properties of the normal neuroglia and, in the case of indirect electro-encephalography of the superficial investing tissues may have differential effects on the various components of the brain potentials. Effects of this sort may help to explain the predominance of slower rhythms.

The electrical silence of new growth is not surprising, since the only activity in such tissue which could produce electrical changes is mitosis, and the chance of a cell division taking place in the tissue close to the electrode during the recording is vanishingly small.

SUMMARY

A description is given of a method for obtaining records of the electrical activity of the deeper tissues in the brain.

The method can be used to supplement conventional methods of identifying and locating subcortical tumours at operation.

The presence of a space-occupying lesion can be detected by its electrical inactivity.

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Normal cerebral white matter is identifiable by rhythmic electrical activity of the same type as that found in the cortex.

White matter adjacent to a space-occupying lesion displays slow delta activity similar to that seen in the cortex in the same condition.

The spacial extent of a lesion and the zone indirectly affected by it may be delimited with satisfactory precision.

Improvements in the technique and subjects for further study are discussed.

We wish to thank Prof. F. L. Golla, director of the Burden Neurological Institute, for his advice and encouragement, Mr. P. B. Ryan, F.R.C.S., for his practical help and criticism, and the Medical Research Council for their help in defraying a part of the cost of the equipment.

REFERENCES

Brooks, A. A., Walter, W. Grey (1945) *Electronic Engineering*, in press.
Butler, J. A. V. (1940) Electrocapillarity, London.
Cobb, W. A. (1944) *J. Neurol. Neurosurg. Psychiat.* 7, 96.
Dole, M. (1935) Principles of Experimental and Theoretical Electrochemistry, New York.
Foerster, O., Altenburger, H. (1935) *Dtsch. Z. Nervenheilk*, 135, 277.
Krynauw, R. (1939) *Brit. med. J.* ii, 160.
Scarff, J. E., Rahm, W. E., jun. (1941) *J. Neurophysiol.* 4, 418.
Schwartz, H. G., Kerr, A. S. (1940) *Arch. Neurol. Psychiat.* 43, 547.
Walter, W. Grey (1936) *Lancet*, ii, 305; (1937) *Proc. R. Soc. Med.* 30, 579.
— Dovey, V. J. (1944) *J. Neurol. Neurosurg. Psychiat.* 7, 57.
Williams, D., Gibbs, F. A. (1939) *Arch. Neurol. Psychiat.* 41, 519.

SCHISTOSOMIASIS

INTENSIVE TREATMENT WITH ANTIMONY

WILLIAM ALVES B.A. — DYSON M. BLAIR O.B.E., M.B. Edin., D.P.H.

From the Schistosomiasis Research Laboratory, Salisbury, Southern Rhodesia

A PRELIMINARY note on the intensive treatment of 6 cases of schistosomiasis with antimony has already been published (Alves 1945); in this paper a further 100 cases are discussed.

Intensive antimony therapy, like intensive arsenic therapy, is based on the work of Chargin and his collaborators (1935) who demonstrated that drugs rapidly injected intravenously might give rise to what they called "speed shock." They were, on the other hand, able to introduce comparatively large amounts of substances as toxic as histamine without difficulty, if not more than 2–3 c.cm. per minute was injected. They then applied these findings to the treatment of syphilis with large doses of arsenical preparations (Hyman et al. 1939). Their work was based on an intravenous-drip transfusion technique, which of course seriously limited the use of the method in large-scale treatment campaigns.

Eagle and Hogan (quoted by Cole et al. 1943), working on rabbit syphilis, showed that multiple syringe injections were more effective in cure than the continuous-drip technique. Their term "multiple syringe injections" implies four intravenous injections daily.

"Continuous drip" with a solution of 5% glucose-saline containing gr. 1 of sodium antimonyl tartrate per 100 c.cm. was tried in one case by Alves (1945). This solution, even when given at the slow rate of 100 c.cm. per hour, caused excruciating phlebalgia. It was obvious from a practical point of view that continuous drip with antimony salts in the treatment of schistosomiasis could not be applied on a large scale. Therefore all the cases which are discussed here have been treated by a multiple syringe-injection technique.

It is generally recognised that the present methods of treatment of schistosomiasis with antimony salts do not lend themselves to successful mass treatment on a country-wide scale. It is estimated that in Southern Rhodesia there are probably at least half a million victims of the disease, and no practical attempt has yet been made to deal with the problem of treating these cases.

MATERIAL

All the cases described in this paper are in men, mostly Africans, suffering from either urinary or intestinal schistosomiasis. They were diagnosed by a cercarial antigen intradermal test developed by one of us (W. A.) and to be described in another communication. In each case the skin-test diagnosis was confirmed by the demonstration of viable schistosome eggs in either the urine or the stool. The cases chosen for treatment were selected mainly from the Rhodesian African Rifles, a native regiment, in order that follow-up and continuous observation would be facilitated, and the chances of re-infection immediately after treatment reduced to a minimum. It should however be noted that the patients were not all "A1" soldiers, and among the incidental conditions noted were asthma, malaria, hookworm, and congestion of the lungs. These cases were treated as successfully, and apparently as safely, as the 6 already described. Each patient was weighed and medically examined on admission and a further skin-test and an eosinophil count were done. The cases are summarised in table I.

TREATMENT

Total Dosage.—The dose of sodium antimonyl tartrate (S.A.T.) has been standard throughout: 12 mg. per kg. of body-weight. This is almost equivalent to one grain per 12 lb. of body-weight, so that a person weighing 144 lb. receives a dose of gr. 12.

Division of the Dose.—In the earlier work (Alves 1945) the total dose of antimony salt was distributed in six, seven, or eight injections over a period of 2 days (30 hours). It was found that the total dose could easily be administered in six injections, and these were given at 9 A.M., 12 noon, and 3 P.M. on each of two successive days. For reasons of economy, because ampoules of the drug had to be used, the dosage was worked out to give as many doses in each course of gr. 2 or gr. 1 as possible. For example (doses in grains):

	9 A.M.	12 noon	3 P.M.	9 A.M.	12 noon	3 P.M.
Patient A: gr. 10 S.A.T. given as:	2	2	1	2	2	1
Patient B: gr. 13½ S.A.T. given as:	2	2	2½	2½	2½	2
Patient C: gr. 9¼ S.A.T. given as:	2	2	1	2	1¼	1

In no case was it ever found necessary to reduce the calculated dose because of untoward symptoms.

Technique of Administration.—A 10 c.cm. all-glass syringe with an eccentric nozzle was used. An American gauge 23 needle was found to be the most suitable size, for slow injection through such a bore is not difficult, whereas a larger bore needle encourages rapid injection.

As already mentioned, ampoules of the drug were used throughout, because no S.A.T. powder was available. These ampoules were made up to contain gr. 1 of S.A.T. per c.cm. of fluid. Since it would be very difficult to inject smoothly 2 c.cm. of fluid in five minutes the injection was made up to 10 c.cm. with a 5% glucose-saline solution. The small amount of glucose administered in each injection is not thought to have any detoxicating effect. The glucose-saline was dispensed in 10 c.cm. quantities in test-tubes and autoclaved for twenty minutes. It is found useful when making up the injection to affix the needle to the syringe, remove the piston from the barrel, and pour the glucose-saline into the barrel. The piston is replaced, the syringe inverted, and the air and excess glucose-saline expelled—e.g., if gr. 2 of S.A.T. is to be injected, 8 c.cm. of glucose-saline is left in the syringe; the required amount of S.A.T. solution is then drawn up through the needle in the usual way. The piston is then withdrawn slightly and the contents of the syringe are mixed by inversion. The piston is finally adjusted so that no air remains in the syringe.

A vein in the antecubital fossa is chosen and the needle inserted. It has been found that the same vein and indeed the same puncture can be used for all six injections. As soon as withdrawal of blood has shown that the needle is in the vein, the exact time is noted and the injection is begun. With the piston moving steadily, the injection is given at the rate of 2 c.cm. or less per minute. A minimum time of five minutes is therefore taken to complete the injection.

This slow and steady injection of the drug is of fundamental importance in the success of the treatment.

With practice the speed of injection can be judged accurately without the aid of a watch, but the speed of injection cannot be judged by an inexperienced worker without a watch and he invariably injects too quickly unless he times himself.

Reactions to the Treatment.—It has not been necessary in any case to discontinue or modify the treatment on

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TABLE I—SUMMARY OF CASES TREATED

Case	Type of infection	Eosinophils (%)	Weight (lb.)	Total dose S.A.T. (gr.)	Follow-up two months		
					Skin-test	Gain or loss of weight (lb.)	Eosinophils (%)
1	M	1	123	10¼	−	+5½	1
2	H	3	123	10½	−	+8	3
3	H	5	136	11½	−	+2	0·5
4	H	16	137	11¼		No F-U	
5	M	1	121	10		No F-U	
6	M	3	123	10¼	−	−6	1
7	H	4	137	11¾	−	+4	5
8	H	10	133	11	+	+2	5
9	H	6	127	10¾	−	+10	4
10	H	12	139	11¾	−	+2	1·5
11	H	5	150	12¼	−	−5	6
12	H	8	169	14	−	+3	3
13	..	9	82	7	−	+5½	3
14	H	4	140	11¾	−	−2	1
15	H	6	158	13	+	−6	3
16	H	21	130	11	−	0	3
17	HM	5	125	10½	−	−3	1
18	H	5	131	11	−	+3	3
19	H	9	146	12	+	+3	13
20	H	4	132	11	−	+4	4
21	HM	16	131	11	−	+9	14
22	H	4	152	12¾	+	+1	0
23	H	12	161	13½	−	+2	5
24	HM	8	136	11½	−	+3	12
25	H	2	135	11¼	−	0	4
26	M	4	155	13	−	0	1
27	H	4	143	12	−	+1	2
28	H	1	165	13¾	+	+2	1
29	H	7	162	13½	+	−6	2·5
30	H	9	132	11	+	0	6
31	HM	18	148	12½	+	−15	10
32	H	6	116	9¾	−	−4	2
33	H	5	132	11	−	+3	8
34	H	6	154	12¾	−	+3	3
35	H	8	157	13	−	+5	0
36	H	1	135	11¼	+	+1	0
37	H	6	127	10½	−	+4	0·5
38	H	..	139	11¾	+	0	5
39	H	..	168	14	−	+2	7·5
40	H	..	124	10½	−	+1	2·5
41	M	..	126	10½	−	−1	11
42	H	..	156	13	+	+10	0·5
43	M	..	126	10½	+	+2	8
44	H	12	158	13	+	−4	3
45	H	4	170	14	−	−5	1
46	H	18	128	10¾	−	No F-U	
47	H	14	122	10	−	+3	22
48	H	6	137	11½	−	−5	4
49	H	21	162	13½	−	0	1
50	H	0	152	12½	+	−4	1
51	H	22	148	12¼	−	+6	11
52	H	..	126	10½	−	−1	7
53	H	..	127	10½	−	0	4
54	H	..	127	10½	−	+1	3·5
55	H	..	137	11½	−	−2	2·5
56	H	..	123	10¼	−	+5	0·5

TABLE I—(*continued*)

Case	Type of infection	Weight (lb.)	Total dose S.A.T. (gr.)	Case	Type of infection	Weight (lb.)	Total dose S.A.T. (gr.)
57	H	134	11	79	HM	130	10¾
58	H	122	10	80	..	124	10½
59	H	136	11½	81	H	132	11
60	H	128	10¾	82	..	124	10½
61	H	136	11½	83	HM	154	12¾
62	M	156	13	84	H	149	12½
63	M	132	11	85	H	114	9½
64	H	156	13	86	H	125	10½
65	H	164	13½	87	M	117	9¾
66	H	135	11½	88	M	140	11¾
67	H	145	12	89	M	136	11½
68	H	110	9¼	90	H	148	12½
69	H	120	10	91	H	120	10
70	H	145	12	92	H	154	12¾
71	H	132	11	93	H	138	11½
72	H	129	10¾	94	H	148	12½
73	H	112	9½	95	M	125	10½
74	H	134	11	96	H	123	10¼
75	H	140	11¾	97	H	102	18½
76	..	132	11	98	M	155	13
77	M	146	12¼	99	M	129	10¾
78	H	128	10¼	100	HM	118	10

H = hæmatobium. M = mansoni. F-U = follow-up.
Cases 13, 75, and 76 were Europeans; remainder Africans.
Cases 13, 76, 80, and 82 were treated on positive skin-test only.
S. hæmatobium infections totalled 74, *S. mansoni* infections, 15, double infections 7.
Eosinophil counts before treatment in cases 75 and 76 were 15 and 8%. In remainder of cases 57–100 no eosinophil count was done and no follow-up can yet be reported.

account of severe reaction to the drug. The symptoms commonly attributed to the antimonial drugs are salivation, a hard unproductive cough, vomiting, and "rheumatic" pains; less commonly there is constriction of the chest, abdominal cramps, or collapse. Some of these symptoms were encountered in this series (table II). Constriction of the chest was noted in one patient who had a history of asthma, and abdominal cramps were encountered in 3 cases. There were no collapses.

It will be seen from table II that coughing was much more frequent after the 1st and 2nd injections than after any other. The cough never lasted more than two minutes, and as a rule did not begin until after the injection had been completed. Salivation was often noted after the early injections but it had commonly disappeared by the second day. The table shows the number of patients who were observed vomiting soon after injection, and does not include those who may have vomited at other times. "Rheumatic" pains, especially in the shoulders, are a feature of ordinary courses of S.A.T., particularly in the second half of the course. This symptom was not encountered in our series.

In a group of 50 cases the pulse-rate was observed immediately before each injection and the average rates were as follows:

Before	1st	injection	64 per min.
,,	2nd	,, ...	66 ,, ,,
,,	3rd	,, ...	67 ,, ,,
,,	4th	,, ...	65 ,, ,,
,,	5th	,, ...	64 ,, ,,
,,	last	,, ...	60 ,, ,,

These findings do not support the commonly held view that bradycardia is a frequent result of antimony treatment. Weese (quoted by Schmidt and Peter 1938) has suggested that bradycardia after potassium antimonyl tartrate is probably due to the potassium radicle, and since sodium antimonyl tartrate was used exclusively in our series we are inclined to agree that antimony in itself does not produce a bradycardia.

A brisk hæmaturia was noted in 2 cases during treatment. Specimens of urine were being collected for antimony estimations and the hæmaturia did not begin until late in the afternoon of the first day of treatment. In neither case did the hæmaturia persist, but it was sufficiently severe to reduce the hæmoglobin of one patient from 58% to 50% (Newcomer) in the course of three days.

In only one patient in the whole series was a "drug rash" observed. It appeared 24 hours after the last injection and persisted for about a week. The rash was limited to the neck and shoulders between the mandibles and the clavicles and was symmetrical in distribution.

Medical examination on the day after treatment did not in any case reveal cardiac arhythmias or other circulatory dysfunction. It was intended to do electrocardiograms on a series of these cases but war-time difficulties of supply prevented this.

A striking feature in many of our cases was the euphoric state of the patient on the day after treatment had been concluded. Africans as a rule do not fear treatment by injection, and the euphoria is hard to explain on the grounds of relief. This euphoria was also well-marked in the few European cases we treated, and we might quote the European sergeant who was due for discharge from the Army; he played nine holes of golf the day after the completion of his course, and "threw a hectic discharge party" the next day.

Although we intended to maintain complete rest in bed for all patients for the two treatment days, this was seldom if ever honoured by the patients, who preferred to leave the ward soon after the injection and sit in the sun. They were of course excused all duties and did no work. They were however on full duty within a week of the commencement of treatment, undertaking route marches, physical training, and the other arduous activities of the Army recruit.

TESTS OF CURE

Immediate Examination of Stool and/or Urine.—As will be seen from table I most of the cases treated were *S. hæmatobium* infections, and examination of the centrifugalised deposit of urine on the day after treatment did not in any case reveal living healthy eggs. Many of the eggs seen were distorted and the miracidia were dead. When attempts were made to hatch apparently living miracidia the large majority failed to escape

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from the shell. Those few miracidia which were able to rupture their shells died beside them without exhibiting the usual activity. The amount of red blood-cells and eggs in the urine varied from case to case; some excreted large numbers while others showed few or none. No microscopic evidence of nephritis, such as casts, was found in our cases.

In the *S. mansoni* infections a similar situation is met although, of course, demonstration of eggs in the stool is an unsatisfactory business.

Later Examination of Stool and/or Urine.—Absence of eggs from the excreta two months after treatment has been used as a criterion of cure. In none of the cases examined after this period have eggs been found, and in many cases the urine is clear and shows no red blood-cells. Examination of specimens of excreta one or two weeks after treatment may reveal dead eggs but these disappear.

Cercarial Antigen Skin-test.—Since we are not entirely satisfied with a failure to demonstrate eggs as a criterion of cure we have endeavoured to assess this more accurately by employing the skin-test already mentioned. In table I it will be seen that a big proportion of our cases became "skin-test negative" at two months. This reversion from a positive to a negative skin-test is in our view indisputable evidence that death and dissolution of the schistosome worms has occurred.

Many of our patients were skin-tested with the cercarial antigen already mentioned on the afternoon before commencement of treatment. These tests reacted in the usual way in a quarter of an hour with the formation of weals and pseudopodia and had entirely disappeared next morning when the injections of antimony were begun.

At three o'clock in the afternoon of the first day of treatment—that is, six hours after treatment began—in the majority of patients who had been skin-tested an indurated button appeared which sometimes almost reached the size of the original weal. This induration persisted until the second day, after which it slowly faded. We attribute this reaction to the effect of the drug on the worm, with a consequent release of "toxin" into the tissues, and the persistence of the reaction may possibly be explained as due to the death of the worm.

TABLE II—FREQUENCY OF REACTIONS TO INJECTIONS (100 CASES)

Reaction	Injections					
	First day of treatment			Second day of treatment		
	1st	2nd	3rd	4th	5th	6th
Cough	16	10	6	3	4	2
Vomiting	..	6	2	..	3	1
"Rheumatic" pains	..	..	..	..	..	..

Weight.—It was hoped that cured cases would show an appreciable gain in weight. This has not been so. Several cases cured by all our criteria failed to show such gain. There are of course many factors other than schistosomiasis which operate against a gain in weight in the typical African patient. Malaria and hook-worm infestation are only two of the probable parasitic causes. Case 31, for instance, developed an acute attack of malaria (*P. falciparum*) the day after treatment. Most of our African patients are recruits of a few months' standing. These Africans almost universally show a large increase in weight in their first six weeks of service, a phenomenon also observed in the European recruit. Their weight then becomes more or less stabilised, any change being more often than not in a downward direction.

Eosinophil Counts.—In our experience eosinophilia is not always present in schistosomiasis. Table I shows that several normal percentages were found. Many of our patients showed a reduction in the eosinophil percentages two months after treatment, but others again showed no change, or even an increase. It should perhaps be noted here that those cases shown as low total eosinophil percentages also had low total eosinophils. Although this is not shown in the table, all the patients whose eosinophils were enumerated had full blood-counts done.

TABLE III—URINARY EXCRETION OF ANTIMONY

Case	Total dose S.A.T. (mg.)	Dose as Sb (mg.)	Urine excreted in 72 hours (c.cm.)	Sb excreted (mg.)	% Sb excreted
35	845	333	2350	61	18
36	731	288	1900	65	23
46	650	256	3210	58	23
47	682	269	3150	76	28
48	747	294	2680	66	22
49	878	346	1750	70	20
50	813	320	4190	57	18
51	796	314	2410	58	18

Three-month Follow-up of Cases Skin-test Positive at Two Months.—Out of 53 cases followed up for two months, 14 were found to give a positive skin-test reaction, and of these it was possible to examine 9 three months after treatment. At that time 3 cases showed no eggs at all in the excreta; 6 now gave a negative reaction to the cercarial antigen; 2 remained positive, though it was noted that the weals in these cases were smaller than previously, and the ninth previously strongly positive was now weakly positive.

URINARY EXCRETION OF ANTIMONY

In 8 cases the antimony excretion in the urine during treatment and for the day after—i.e., a total of 72 hours—was estimated (table III). It is already well established (Schmidt and Peter 1938) that by far the greater part of the antimony excreted is via the kidneys. It therefore appears that in these cases between 70% and 80% of the antimony injected remains in the body at the end of 72 hours. In the average case this amounts to about gr. 8 (520 mg.) of S.A.T. It seems to us that it is this high concentration of antimony in the tissues over this short period which is responsible for the rapid disappearance of healthy eggs and the apparent cure in all our cases.

DISCUSSION

We believe that the public health and economic implications of the method of treatment now described are even more important than its value to the individual sufferer from the disease, though to the patient this treatment offers a quicker and less disabling course with a greater probability of cure.

Mass treatment of schistosomiasis has been practised in several countries, particularly Egypt, where, by a system of mobile treatment units, complete population groups have received standard courses of antimony. The general impression seems to be that mass treatment campaigns have not proved their value, and in Egypt at least the emphasis in the control and prevention of the disease has swung over to the health educational aspect. Khalil (1924, quoted by Schmidt and Peter 1938), while admitting that the possibility of re-infection is difficult to exclude, stated that 34% of cases treated in mass campaigns relapsed. Mass treatment in any country has of course been handicapped by the necessity for keeping patients under observation and control for a month; this period, by occupying staff and equipment limits the numbers who can be treated in a year. Rose's (1937) remarks on mass treatment campaigns are to the point: "... complete unanimity exists among all Egyptian specialists. No influence on the mere occurrence of the disease has been obtained by the present methods." He goes on to say that if only a quarter of those infected there could be treated yearly (that is ten times the present numbers) the results would be very different.

It will be obvious that a two-day treatment employed on mass lines will result in a huge increase in the turnover of patients and an equally large reduction in desertions and uncompleted treatments. Furthermore, if our results are achieved in a mass campaign the relapse-rate will be at worst very low.

Heretofore mass campaigns have been truly such, in that every person who can be reached is treated. This method is practicable where extremely high infection-

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rates exist—e.g., Egypt and Venezuela (Scott 1942). Southern Rhodesia presents a different picture. While certain foci of high infection-rates exist, the total infection-rate of Africans is probably about 50%. In such circumstances a treatment campaign without previous diagnosis is wasteful of time and money. On the other hand, to undertake the diagnosis of each patient by stool and urine examinations would involve doubling the staff and providing expensive equipment, microscopes, centrifuges, mobile laboratories, and so on.

With the cercarial antigen skin-test we are now investigating it seems to be possible to exclude uninfected cases with certainty—that is to say, we have not encountered in several thousand tests a negative skin reaction with viable eggs in urine or stool. Since its performance and reading are speedy and require a minimum of equipment it is feasible to combine mass fast diagnosis with mass fast treatment, with no increase in staff or expense.

The economic implications are equally obvious. The intensive treatment described employs roughly half the drug used in the normal treatment. Mass treatment centres involve the feeding, housing, and policing of the patients, and it is not necessary to labour the difference between three and thirty days. We are convinced that the admission of patients to hospital for this treatment is not necessary and that the provision of such facilities as are now available at clinics and dispensaries in the native areas of this country is all that is required. African or European medical orderlies who are already capable of performing intravenous injections should be able to learn without difficulty and in a few days the "slow injection" technique which is the basis of our method.

We suggest that this intensive antimony therapy could find a place in the treatment of kala-azar, the other forms of leishmaniasis, and in filariasis.

SUMMARY

A hundred cases of schistosomiasis have been treated with a two-day treatment using sodium antimonyl tartrate with a "multiple syringe" technique.

No viable eggs were found in any case immediately after treatment or at two months and three months after treatment in the cases followed up.

In 53 cases followed up for two months the cercarial antigen skin-test had become negative in all but 14 cases (73%).

Nine of the 14 skin-test-positive cases were observed for three months and the test became negative in 6 cases in this period.

The method should much facilitate mass treatment in the control of schistosomiasis.

We are indebted to Dr. A. P. Martin, O.B.E., Medical Director, Southern Rhodesia, for permission to make this communication; to Major O. E. Jackson, S.R.M.C., and his staff, particularly S/Sgt. Stowe, S.R.M.C., for their assistance at the Rhodesian African Rifles Hospital; and to Mr. A. W. Facer, F.R.I.C., for the antimony estimations.

REFERENCES

Alves, W. (1945) *S. Afr. med. J.* **19**, 171.
Chargin, L., Leifer, W., Hyman, H. T. (1935) *J. Amer. med. Ass.* **104**, 878.
Cole, H. N., Heisel, E. B., Stroud, G. (1943) *Ibid*, **123**, 253.
Hyman, H. T., Chargin, L., Rice, J. L., Leifer, W. (1939) *Ibid*, **113**, 1208.
Rose, G. (1937) *Chinese med. Ass. spec. Rep. Ser. No.* 2 (abstracted in *Trop. Dis. Bull.* 1937, **34**, 864).
Schmidt, H., Peter, F. M. (1938) Advances in the Therapeutics of Antimony, Leipzig, pp. 223, 237.
Scott, J. A. (1942) *Amer. J. Hyg.* **35**, 337.

ADDRESSING the Pharmaceutical Society of Great Britain on Dec. 13, Mr. C. J. Blok, chief pharmacist to the university and municipal hospitals at Amsterdam, said that about 1943 many articles became so scarce in Holland that prescribing by doctors had to be limited. Cod-liver oil could be prescribed only for tuberculosis, atropine only for Parkinsonism and eye drops, and phenobarbitone only for epilepsy. Insulin also became very scarce. In September, 1944, came the loss of gas and electricity, and operating-rooms had to resort to chemical sterilisation with 4 per cent 'Lysol,' or a mixture of borax carbolformalin with a little sodium nitrite against rusting. A very stable solution with quite effective sterilising powers was—2% formalin, 2·5% phenol, 1·5% borax.

TREATMENT OF SCHISTOSOMIASIS

W. G. MILLS
F.R.C.S.
MAJOR R.A.M.C.

THIS paper records the results of treating schistosomiasis along somewhat unorthodox lines, the apparently good short-term results being sufficient to warrant publication. In my previous 2½ years' experience of the disease I had been disappointed by the high relapse-rate which followed antimony therapy in normal dosage and by the length of treatment of the severe cases. I accordingly determined to try the effect of a high concentration of antimony in the body over a relatively short period in an effort to kill every adult and developing schistosome. My material consisted of consecutive patients admitted with vesical schistosomiasis (*Schistosoma hæmatobium*) to a military hospital in West Africa in 6 months. All were African troops, and in no case could the immediate attack be considered a primary infestation. Cystoscopy was invariably employed for initial diagnosis and subsequent review. No control series was available, and I relied on clinical impressions of patients treated during the past 2 years, some of whom were under treatment for 2 or 3 months, and of the patients admitted who had relapsed after orthodox treatment elsewhere.

TREATMENT

Sodium antimony tartrate was not used, for we usually had adequate stocks of two other antimony preparations whose toxcity was believed to be lower. Either stibophen B.P. (B.W.Co.) or 'Anthiomaline' (M.&B.) was used throughout, but owing to temporary difficulties of supply 5 patients who began with stibophen had to conclude their course of treatment with anthiomaline. The principle of dosage was to give a maximum dose of antimony (nearly 0·5 g.) in less than a fortnight; hence a course of anthiomaline consisted of daily injections (Sundays excepted) of 4 c.cm. intramuscularly for a fortnight (total antimony 0·46 g.), while stibophen was similarly administered in 5 c.cm. doses (Sat. and Sun. excepted; total antimony 0 49 g.). All treatment was carried out in hospital, and during the 2nd week patients were encouraged to stay in bed; a hexamine mixture was given throughout, and patients with severe superadded staphylococcal cystitis received sulphathiazole 2 g. daily for 7 days.

Cystoscopy was performed before treatment, a week after the last injection (when the patient commonly returned to duty), and thereafter three times at monthly intervals, so far as could be arranged. For a case to be considered cured we insisted on examination 3 months after treatment to show a bladder free from all tubercles, ulcers, and granulations, though we accepted a minor degree of trigonitis as inevitable in a country where urethritis is the rule rather than the exception; unfortunately this ideal was often not achieved owing to administrative difficulties, and of necessity I established a class of "presumed cured" patients, in whom the last cystoscopy had shown a virtually normal bladder, and in whom no clinical relapse was reported. Late relapses of this disease have been reported, the latent period being measured in years rather than months, but I have had no opportunity of observing cases for this length of time.

COMPLICATIONS

I was particularly anxious to observe any complications that might arise as a result of the uniformly concentrated dosage used, regardless of body-weight, in adult males weighing 7–11 stone. Toxic effects were noted in 5 patients, all of them undeveloped adolescents whose "Army age" was alleged to be 18, and it was concluded that these complications could readily be eliminated by making dosage proportional to body-weight. In 3 of these cases vomiting started in the 2nd week, and reduction of dosage was required in one undersized youth who brought up five large roundworms; 2 other patients developed irritating coughs, which led in one case to a small hæmoptysis. In none of these, nor in any of the other patients who often appeared listless towards the end of treatment, was there any ill effect apparent a week after the end of the course.

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RESULTS

During the 6-months period under review 57 cases of vesical schistosomiasis were admitted to hospital, but 11 are excluded owing to failure to complete treatment for various reasons unconnected with this disease. The accompanying table shows that 42 out of 46 patients returned to duty in their original medical categories, with results which were sufficiently satisfactory to themselves and their medical officers for many of them not to respond regularly to demands for follow up.

RESULTS OF TREATMENT

Result	No. of patients treated with—			Total
	Anthiomaline	Stibophen	Stibophen + anthiomaline	
Cured	9	8	0	17
Presumed cured	14	6	5	25
Not cured ..	3	1	0	4
Total ..	26	15	5	46

ILLUSTRATIVE CASE-RECORD

CASE 1.—A soldier, whose reputed age was 18, had had hæmaturia at intervals since childhood, and had recently developed severe dysuria. Urine contained many ova of *S. hæmatobium* and was sterile on culture. Cystoscopy on April 14, 1944, showed extremely severe infestation, with many recent tubercles superimposed on old ulcers and massive granulations, chiefly basal, both ureteric orifices being involved. Routine course of anthiomaline 48 c.cm started. Cystoscopy on May 5 showed almost unbelievable improvement: one large papilloma on the right wall and a few patches of granulations in the posterior part were the only evidence of disease. Patient was discharged from hospital. Cystoscopy on June 9 showed papilloma smaller and avascular, rest of bladder normal. Follow-up cystoscopy on Sept. 22 showed a small avascular elevation at the site of the old papilloma.

This case demonstrates the rapid return to normal of a severely diseased bladder when the causal parasite is killed; the removal of the papilloma could doubtless have been accelerated by diathermy.

Failures.—In 4 patients the routine treatment did not raise their medical category and make them fit for duty, and a review of these throws light on the pathology. In no case was the patient left with active infestation.

CASE 2.—A particularly severe case with gross basal ulceration of the bladder had already received several small doses of anthiomaline at irregular intervals: after a full concentrated course of the same drug progress was apparently excellent, until a small new crop of tubercles appeared outside the right ureteric orifice at the end of the 2nd month; a full course of stibophen was given, and a 3-month cure resulted.

CASE 3.—A case of moderate severity, affecting almost the entire bladder, healed satisfactorily with stibophen, but a month later a new crop of tubercles appeared, and a course of anthiomaline was given, with no further relapse in 3 months.

CASE 4.—A severe case, with many ulcers and gross vesical spasm, improved under anthiomaline; but the bladder remained contracted, with a maximal capacity of 5 oz., and the soldier was invalided out of the Army.

CASE 5.—A chronic case of long duration was apparently cured by anthiomaline but developed a severe staphylococcal cystitis; this relapsed 3 times; and, although the schistosomiasis remained cured, the patient was finally invalided out of the Service.

CONCLUSIONS

It seems right to conclude that both anthiomaline and stibophen will cure over 90% of cases of vesical schistosomiasis of any degree of chronicity, provided that the drug is given in concentrated dosage. Since the parasite cannot multiply in the body, any relapse (less than 5% in our series) will be due to one or more adult worms which have resisted the first course, and it may safely be treated with the alternative drug; late relapses are not excluded but are considered improbable.

SUMMARY

Treatment of 46 cases of infestation with *Schistosoma hæmatobium* in West African troops is described, with a 3-months follow-up period.

Anthiomaline and stibophen appear equally satisfactory, if used in a dosage which approaches toxicity.

Cystoscopic control throughout is essential.

I wish to thank Lieut.-Colonel N. L. Shepperd, R.A.M.C., for his invaluable advice and stimulation; Miss S. Murphy, Q.A.I.M.N.S., for her skill in nursing and controlling a most difficult ward of patients; and Colonel K. Fletcher-Barrett, for permission to publish.

LARGE MISSILE LODGED IN THE FACE WITH MINOR CLINICAL DISTURBANCE

THOMAS GIBSON
M.B. Glasg., F.R.C.S.E.
CAPTAIN R.A.M.C.
From a Maxillofacial Surgical Unit, B.L.A.

THE following case presents several bizarre and unusual features.

A gunner arrived as a walking case at a maxillofacial unit in the B.L.A., some 8 hours after injury, complaining of a small laceration on the left cheek and some stiffness of the lower jaw. His impression was that he had been hit by a Spandau bullet, but he did not think it had penetrated.

Examination showed a ragged vertical laceration on the left cheek about 1 in. long and 1 in. in front of the left ear. The left side of the face was swollen but not grossly so. There was malocclusion of the teeth, the mandible being swung to the right. The maxillary block was firm. No other abnormality was noticed inside the mouth, and there had been no bleeding from mouth or nose.

A tentative diagnosis of a fracture of the left condyle or left ascending ramus of the mandible was made and radiography ordered. The resulting film (fig. 1) surprised even the

Fig. 1—Postero-anterior radiogram of face, showing size of missile and its position. The lateral view showed it to be lying at a level just behind the maxilla and in front of the ear.

radiographer, who thought the foreign body was an unexploded cannon-shell. Our own knowledge of ballistics being also very slight, operation was started with considerable misgivings.

Operation.—The foreign body was easily localised through the entry wound and was very gingerly removed. It proved, however, to be non-explosive and solid and was later identified as a 20-mm. cannon-shell. It measured 85 mm. in length and weighed 147·3 g. The wound track passed inwards and slightly backwards; through the coronoid process of the mandible, which was fractured, as was also the condyle (fig. 2); behind the maxilla into the nasopharynx. The maxillary antrum was not involved.

After removal of the cannon-shell no bleeding took place from the cavity, which was powdered with penicillin and sulphathiazole. The skin wound was trimmed and completely sutured. Temporary intermaxillary fixation of the

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jaws was provided by two pairs of eyelet wires. These were later replaced by cast metal cap splints incorporating a guiding flange (Major L. M. Irwin, Army Dental Corps).

Postoperative Course.—No postoperative complications were expected in this case, since the wound cavity appeared to have good drainage into the nasopharynx. The left side of the face remained swollen, however, although the skin wound healed soundly, and 8 days after operation definite fluctuation could be felt. A small incision was therefore made through the wound scar, and drainage was provided. There was no pus in the wound, but some bloodstained serous fluid escaped. This proved later to be saliva, and a brisk salivary fistula developed. The missile probably damaged either the parotid duct or part of the parotid gland. The patient was evacuated to U.K. 12 days after operation, well, except for the salivary fistula, which may require further treatment.

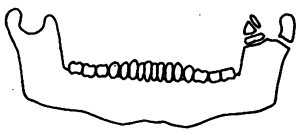

Fig. 2—Diagram showing injury to mandible.

COMMENT

The most interesting points in this case seem to be (1) the large size of the missile, the first of its kind we have seen; and (2) the fact that such a mass of metal could be accommodated in a compact vital structure like the face and cause so little disability. There is probably no other site in the face, except the oral cavity, where this could have happened.

My thanks are due to the Director-General of Army Medical Services and to Major FitzGibbon, O.C. of the unit, for permission to publish the case; and to Major Irwin who carried out the dental work.

DETERMINATION OF PATHOGENICITY OF TUBERCLE BACILLI BY THEIR INTERMEDIATE METABOLISM

JÖRGEN LEHMANN
M.D. Lund
LATE PROFESSOR OF BIOCHEMISTRY, UNIVERSITY OF AARHUS
From the Central Laboratory, Sahlgrenska Hospital, Gothenburg

THE intermediate metabolism of the tubercle bacillus has been studied by Dieckmann and Mohr (1933), Loebel et al. (1933), Nakamura (1938), and Bernheim (1941). The Warburg technique was used for measuring the oxygen consumption of the bacilli in the presence of different metabolites. Bernheim made the interesting observation that benzoates and salicylates much increased the oxygen uptake, and he suggested that substances of similar chemical constitution may play a rôle in the normal cellular metabolism of the bacilli.

Using an attenuated bovine strain—the Calmette (B.C.G.) strain—I have not been able to find any increase in oxygen consumption in the presence of salicylates or benzoates. Since the B.C.G. strain was grown on Souton's synthetic medium, and not on beef and glycerol infusion broth as was the case with Bernheim's strains, this medium was also used for the B.C.G. strain in the present experiment, but salicylates and benzoates still had no effect. Bernheim used both the Bovine B_1 strain isolated at Saranac Lake and the human H–37 strain, so it was evident that my failure could not be attributed to a difference in the metabolism of bovine and human strains. However, both these strains are pathogenic, whereas the B.C.G. strain is nonpathogenic. I therefore investigated a pathogenic human strain kindly supplied by Dr. A. Wassén of the bacteriological laboratory of the Sahlgrenska Hospital. An increase in oxygen consumption by 72–157% was found in the presence of sodium salicylates. The findings in a typical experiment with this strain as well as with the B.C.G. strain are shown in figs. 1 and 2.

The experimental conditions were as follows:

With a platinum spiral (1 cm. diameter) 6–8 loopsful of the bacilli from cultures 2–16 weeks old were suspended in 10 c.cm. of sterile 0·9% NaCl solution, centrifuged, and washed once or twice with 20 c.cm. of saline. The mass of the bacilli was homogenised in a mortar with about 20 c.cm. of *M*/15 Sörensen's phosphate buffer solution (pH 6·8). The Warburg vessels (15–18 c.cm) contained 2 c.cm. of the suspension of bacilli, 0·1 c.cm. of 0·1 *M* sodium salicylate (to be added from the side cup), and phosphate buffer to make a total volume of 3 c.cm.; 0·2 c.cm. of 5% KOH was placed in the well. Temp. 37·5° C. Frequency of shaking 80–90 times per min.; amplitude ± 2 cm.; atmosphere, air. The salicylate was added either at once or after an interval of 1–3 hours. The dry weight of the bacilli was determined after the experiment and ranged from 2 to 15 mg. in the different experiments. The solutions and vessels were sterile. To detect possible contamination with other bacteria a beef infusion broth was used. Contaminated vessels were not taken into account (figs. 1 and 2).

Further experiments were made to determine whether the difference found was characteristic only for the two strains investigated or if it was a general difference in metabolism between pathogenic and nonpathogenic strains. Some different strains were kindly supplied by Prof. G. Olin of the State bacteriological laboratory in Stockholm. Pathogenic and nonpathogenic strains, human and bovine, were represented. A strain was accepted as pathogenic if guineapigs were killed by a subcutaneous injection of 10^{-6} mg. of bacilli. With a nonpathogenic strain guineapigs survived a subcutaneous injection of 10 mg. of bacilli. The results are given in the table.

It will be seen that pathogenic strains, human as well as bovine, grown either on Souton's medium or on glycerol infusion broth, all show a positive salicylate effect (increased O_2-uptake), whereas the nonpathogenic strains are negative (no change in oxygen uptake).

The negative result with nonpathogenic strains does not seem to be due to the impermeability of the capsule for salicylates since the same results were obtained with bacilli ground in a mortar with sand or glass powder. The failure to oxidise salicylates and benzoates is therefore due to a lack of enzymes or to some associated factor.

When the culture was so old that no oxygen uptake took place, the salicylate effect was abolished. The correlation between the salicylate effect and the pathogenicity of tubercle bacilli of different ages is now under investigation.

So far as the experiments permit one to draw conclusions, a difference in metabolism exists between pathogenic and nonpathogenic strains of the tubercle bacillus as shown in the oxygen uptake in the presence of salicylates. The same difference, though less definite, could be demonstrated with benzoates.

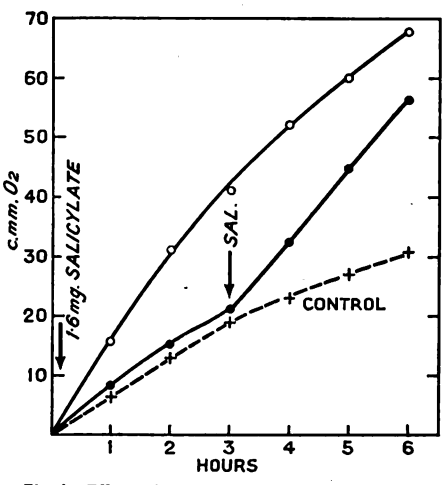

Fig. 1—Effect of sodium salicylate on the oxygen uptake of a pathogenic human strain of the tubercle bacillus (H.W.). Positive salicylate effect.

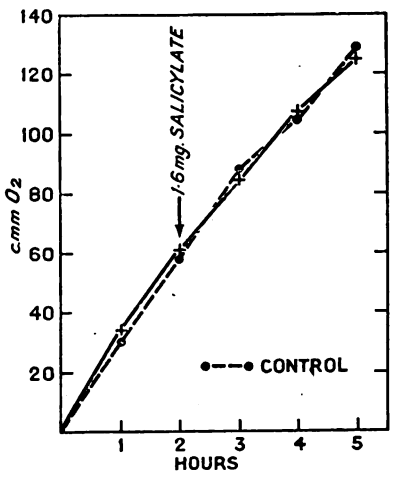

Fig. 2—Effect of sodium salicylate on the oxygen uptake of a non-pathogenic bovine strain of the tubercle bacillus (B.C.G.). No salicylate effect.

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EFFECT OF 1·6 MG. SODIUM SALICYLATE ON THE OXYGEN UPTAKE OF DIFFERENT PATHOGENIC AND NONPATHOGENIC HUMAN AND BOVINE STRAINS OF THE TUBERCLE BACILLUS

Strain	Pathogenicity	Bovine or human strain	Culture medium	Age of culture (weeks)	Salicylate effect. Increase in O_2%
H.W.	Path.	Human	Glyc. broth	5–6	72–157
H.W.	Path.	Human	Souton	3	82
U_3	Path.	Human	Souton	12	90
K_3	Path.	Bovine	Glyc. broth	12	38
R	Nonpath.	Human	Souton	12	0*
R	Nonpath.	Human	Glyc. broth	16	0
102	Nonpath.	Human	Glyc. broth	2–7	0
B.C.G.	Nonpath.	Bovine	Glyc. broth	2–3	0
B.C.G.	Nonpath.	Bovine	Souton	2–6	0

* Within the limits of about ± 5%.

It cannot as yet be decided whether benzoates and salicylates act as catalysers or as metabolites. If the latter is the case it must be assumed that the pathogenic strains can open the benzene ring in these compounds.

The differences found seem to open up new pathways for studying the biochemistry of the pathogenicity of the tubercle bacillus.

On the basis of the stimulative effect of benzoates and salicylates more than 50 derivatives of these substances were investigated for their inhibitory effect on the growth of tubercle bacilli (competitive enzyme inhibition). Preliminary results of these experiments—bacteriological as well as clinical—are presented in an accompanying paper (Lehmann 1946) with special regard to *p*-aminosalicylic acid as the most effective inhibitor.

REFERENCES

Bernheim, F. (1941) *J. Bact.* **41**, 387.
Dieckmann, H., Mohr, H. (1933), *Zbl. Bakt.* **129**, 185.
Lehmann, J. (1946) *Lancet*, i, 15.
Loebel, R. O., Shorr, E., Richardson, H. B. (1933) *J. Bact.* **26**, 167.
Nakamura, T. (1938) *Tohuku J. exp. Med.* **34**, 231.

Preliminary Communication

PARA-AMINOSALICYLIC ACID IN THE TREATMENT OF TUBERCULOSIS

IN 1940 Bernheim [1] showed that salicylic (2-hydroxybenzoic) acid and benzoic acid increase the oxygen consumption and carbon-dioxide production of the tubercle bacillus, whereas the homologues 3- and 4-hydroxybenzoic acid were inactive. It was concluded that salicylic and benzoic acids were oxidised as metabolites and that similar chemical configurations possibly play a part in the metabolism of the bacillus.

On the basis of these experiments I have investigated more than 50 derivatives of benzoic acid with the purpose of finding a substance possessing bacteriostatic properties against the tubercle bacillus. The substances were synthesised by K. G. Rosdahl, of Ferrosan Co., Malmö. An attenuated bovine strain (B.C.G.) grown on Souton's medium was used for the experiments. The substances investigated were added to the medium in concentrations from 10^{-2} to 10^{-6} mol. The area, or the dry weight, of the bacilli was determined when the surface of the control flasks (100 ml. medium in 250 ml. flasks) was covered with a somewhat packed film of the bacilli—i.e., after 12–20 days.

The most active substance found was 4-aminosalicylic acid (*p*-aminosalicylic acid) producing an inhibition of 50–75% in a concentration of 10^{-5} mol. (1 in 650,000 or 0·15 mg. per 100 c.cm.). The bacteriostatic effect was completely abolished if the amino group was placed in position 3 or 5, or if its place was taken by NO_2. Substitutions in the 4-amino group (by CH_3 or stearic acid) reduced the bacteriostatic effect only slightly or not at all. If the hydroxy group in the 2- position was replaced by CH_3 activity was retained, but not if it was replaced by NH_2 or Cl. Substitutions in the hydroxy group decreased the activity considerably. If the hydroxy group was placed in position 3 instead of 2 the effect was diminished. If the carboxy group was replaced by a sulphonic acid group the activity was abolished. Substitutions in the carboxy group (methyl, ethyl, and furfuranylanhydride) changed the activity only slightly. Double molecules of 4-aminosalicylic acid linked together at position 3 were as effective as 4-aminosalicylic acid but highly toxic to animals.

Animal experiments showed that 4-aminosalicylic acid was not toxic to rats when given for 1–2 months in a concentration of 5% in a synthetic food. A blood concentration of 3–7 mg. of free aminosalicylic acid per 100 c.cm. was found when analysed by Ehrlich's dimethylaminobenzaldehyde reagent. Guineapigs were more sensitive as they showed a decrease in appetite and in growth. No changes in the blood-cells or hæmoglobin were observed either in the rats or in the guineapigs. The substance could be administered by mouth, subcutaneously, intramuscularly, or intravenously. The treatment of experimental tuberculosis in guineapigs and rats is in progress.

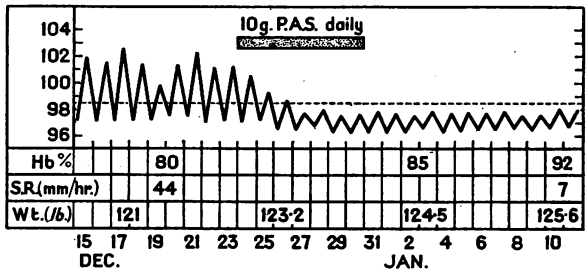

Fig. 1—Chart in case 1, showing effect of third course of *para*-aminosalicylic acid.

Clinical trial.—The treatment of tuberculosis in man was started parallel with the animal experiments. Tuberculous abscesses after thoracoplasty up to 50–60 ml. in volume have been treated daily with a neutral 10% solution of *p*-aminosalicylic acid and showed healing after some months even when they had remained unchanged for 3–6 months before treatment. It has been given by mouth to 20 patients since March, 1944, at the Renstroemska Sanatorium in Gothenburg (Superintendent Dr. G. Vallentin). A blood concentration of 2–7 mg. per 100 c.cm. was achieved by giving 10–15 g. a day. Periods of 8 days' treatment were followed by free intervals of 8 days. It is too early to follow up the results. In many cases, however, a prompt fall in temperature—temporary or permanent—coincided with the periods of treatment and was accompanied by improvement in the patient's general condition as indicated by a gain in appetite and weight, an increase in the red cells and hæmoglobin and a decrease in the erythrocyte sedimentation-rate.

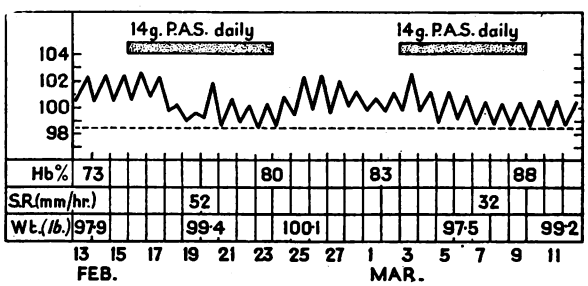

Fig. 2—Chart in case 2.

Two illustrative cases follow.

CASE 1.—A woman, aged 24. Onset of tuberculosis in May–June, 1944. X-ray examination on July 3, 1944, showed an acute general dissemination of cloudy processes in both lungs. Remittent fever 97·5°–101·5° F from July 3 to Nov. 26, when treatment with *p*-aminosalicylic acid (P.A.S.) was given in three periods with concomitant falls in temperature; the last period is illustrated in fig. 1. Normal temperature has been maintained up to the present since this

1. Bernheim, F. *Science*, 1940, **92**, 204.

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treatment. Artificial pneumothorax instituted on March 7, 1945, on the right side for an apical cavity ½–1 in. in diameter.

CASE 2.—A man, aged 35. Bilateral pleural effusion; onset June, 1944. Guineapig test positive on the exudate from both sides. No manifest tuberculosis in the lungs. P.A.S. treatment started Feb. 16, 1945, followed by general improvement (fig. 2). Gain in weight 15½ lb. in two months.

None of the usual effects of salicylates (sweats, ear symptoms) were observed even with a high dosage of *p*-aminosalicylic acid (15 g. daily). The fall in temperature was therefore thought not to be due to a salicylate effect.

The work here recorded was done at the Sahlgrenska Hospital, at the Research Laboratories of the Ferrosan Co. at Malmö, and at the Renstroemska Sanatorium, Gothenburg.

JÖRGEN LEHMANN,
Sahlgrenska Hospital, Gothenburg, Sweden.

Medical Societies

ROYAL SOCIETY OF TROPICAL MEDICINE AND HYGIENE

AT a meeting of the society on Dec. 13 with Dr. C. M. WENYON, F.R.S., the president, in the chair, a discussion on the

Teaching of Tropical Medicine

was opened by Dr. L. E. NAPIER, who said that in the United States of America a serious attempt is being made both to improve the teaching of the subject to the undergraduate and also to develop its postgraduate teaching. In Great Britain, however, tropical medicine appears to have been relegated to the place of a specialty about which the general practitioner need know nothing and with which the ordinary student need not be burdened. These shortcomings require remedying urgently. To avoid overloading the undergraduate curriculum the student should be introduced in his premedical years to selected parasites of man, and the essential clinical diagnostic methods used in tropical medicine should be included in the teaching of clinical pathology. This would leave the pathology, symptomatology, and therapeutics of important tropical diseases to be taught in the systematic lectures on medicine and in the clinical departments as the occasion arose. At this stage it seems entirely wrong to segregate tropical medicine as it has been segregated in the past and to teach the student virtually nothing of the pathology, symptomatology, and therapeutics of tropical diseases. Tropical diseases furthermore could provide excellent examples for teaching the general principles of preventive medicine. Scarcity of clinical material must not be used as an excuse for avoiding clinical teaching; the student of general medicine fails to see examples of many diseases which he will be expected to diagnose and treat later in his practice. Much can be done by the use of lantern slides and cinema films. The future will also bring an increasing number of tropical diseases among those whom the war has taken to the tropics, while rapid air transport may allow cases of tropical disease to enter the country unsuspected during the incubation period. Interest in tropical medicine must be fostered by all means. Short-term exchanges of personnel, research-workers, and teachers between this country and the tropics should be encouraged. As an artificial way of maintaining interest in tropical diseases examining bodies should demand a sound knowledge of the commoner tropical diseases. Turning to postgraduate teaching Dr. Napier said there are few if any places in the world where one can see a better selection of tropical diseases than in London, but owing to the war there is at present no suitable hospital where the available clinical material can be collected; a crying need today is for a "tropical medical centre." Special provision should be made for those who are proposing to specialise in tropical hygiene. Dr. Napier ended by emphasising the necessity for making the undergraduate and his teachers conscious of the existence of tropical diseases, and for the early establishment of a hospital in London that would act as a centre for teaching and research in tropical medicine; meanwhile the society should prepare a memorandum on the teaching of tropical medicine and try to obtain representation on all committees considering the matter.

Sir PHILIP MANSON-BAHR thought that the medical student's burdens should be not increased, but agreed that more emphasis should be laid in the premedical studies on the parasites associated with disease in man. He disagreed with the statement that tropical medicine is entirely neglected in the present undergraduate curriculum, pointing out that in practically every medical school in London lectures on tropical diseases are already given to the undergraduate, and that in the examinations of the last few years questions on the more important diseases have always been included. In the postgraduate courses it is also necessary to avoid overloading the curriculum. The best days of teaching tropical medicine were those when the tropical school was a compact self-contained unit, with the laboratory and clinical work closely linked; a plethora of visiting lecturers, however specialised their knowledge, leads to overlapping and overloading of the curriculum. In teaching tropical medicine differential diagnosis is most important, and the practical value of microscopy cannot be overstressed. Any difficulty of obtaining clinical material would largely be overcome if the general hospitals were more willing to transfer tropical cases to a tropical hospital for teaching purposes.

Prof. R. M. GORDON also agreed that the course in zoology should include the simpler parasitology of man, and that the teaching of tropical medicine should be extended, especially in the undergraduate's final year. The graduate student would then require an amplification of his general knowledge, and such teaching would be well covered by the present D.T.M. & H. course, which does not make a specialist but only a good practitioner for the tropics. He did not believe that the situation in which tropical medicine finds itself in London now that the war is over necessarily means that the subject is in danger throughout the country; the Liverpool School flourished during the war and is confident of its own future. The dearth of living material in this country for the teaching of parasitology and entomology necessitates the artificial maintenance of strains. This involves much labour, and loss of a strain is a disaster unless it is maintained in more than one place; some institution, such as the Wellcome Laboratories of Tropical Medicine, should interest itself in this matter. The Colonial Office and all firms operating in the tropics should insist on a diploma in tropical medicine for their medical officers.

Dr. G. MACDONALD supported broadening the undergraduate curriculum to include more instruction in tropical medicine. He did not admit that the teaching of tropical medicine in London is in a parlous state, but he urged the restoration of facilities lost directly owing to the war and deplored that, outside the special group of those intimately concerned with tropical medicine, interest in the subject has been lost, even the writers of the Goodenough report failing to consider the matter seriously. There must be a centre of clinical research in London to replace that lost in the war, but on a better and more fully equipped scale, and it should coöperate with the existing School of Tropical Medicine as now constituted. Postgraduate teaching in tropical medicine should round off a general medical education and fit the student to practise medicine in the tropics, rather than create a specialist; the specialist requires, in addition to special knowledge of tropical diseases, a high qualification in general clinical medicine. Similarly those specialising in tropical hygiene should hold a D.P.H. as a basis, supplemented by a D.T.M. & H. and experience overseas before taking up independent work in tropical hygiene. The society should form a policy committee to examine and foster the development, teaching, and standards required in tropical medicine and hygiene.

Lieut.-Colonel VERE HODGE, while agreeing that the establishment of an Imperial centre for tropical medicine should be the ultimate object, thought that immediate steps are required to deal with the large numbers of repatriates who may be returning with latent tropical infections; after a long absence from home these persons will not want to be sequestrated in special centres, and this will necessitate a number of tropical units throughout the country. The limitations of teaching tropical medicine in this country will make it necessary to have subsidiary centres abroad, but even short courses in this country would give practitioners going abroad an advantage. Three types of teaching in tropical medicine are

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required—first, undergraduate training; secondly, short courses for those going abroad for the first time; and thirdly, diploma courses for those who already have some experience in the tropics.

Lieut.-Colonel W. R. M. DREW thought that undergraduate teaching in London has always been well balanced; ordinary students have a good grounding in tropical parasitology and the Conjoint Board examinations always include one question on tropical diseases. Early in the war the D.G.A.M.S. approached the deans of the various medical schools, as a result of which special emphasis has been given to instruction in tropical medicine, and voluntary courses have also been given. In addition a hundred short courses for the Services have been held at Millbank. In any curriculum a proper balance of subjects is necessary. The centralisation of cases should offer no difficulty.

Dr. H. S. STANNUS suggested that, taking into account the rapidity of modern transport and the proposed development of the Colonies, regional centres should be established in the tropics to which students, after a preliminary education in this country, could go for further instruction before practising in the respective regions. There should also be interchanges of teachers between this country and the tropics.

Dr. H. C. TROWELL agreed with Dr. Stannus and remarked that general principles of medicine are more important than special practice, since the most important and lethal diseases even in the tropics are the cosmopolitan diseases.

Sir RICKARD CHRISTOPHERS, F.R.S., strongly supported the suggestion for the re-establishment of a tropical centre in London.

ROYAL SOCIETY OF MEDICINE

AT a meeting of the section of psychiatry on Dec. 11, with Dr. G. W. B. JAMES in the chair, a discussion on the

Importance of Diet in Mental Illness

was opened by Dr. W. REES THOMAS. After stressing the importance of the diet as part of the doctor's prescription in the treatment of mental patients, he enlarged on the difficulty of providing a varied diet in a mental hospital, where the stimulus of outside meals, open to the general population, is entirely lacking. Nevertheless, mental hospital diet has greatly improved in the last 30 years. There were a fair number of cases of vitamin deficiencies in British mental hospitals before the last war, but an investigation carried out with Professor Sydenstricker in 1942 revealed very few. Just as the population as a whole lost weight during the first part of the present war, so the average weight of mental patients fell also. Thus 77–78% of patients lost weight during the 1939–41 period (on the average about 0·5 stone), as compared with the peace-time figure of about 45%. The caloric value of the food during the early war period also dropped from 3000 to 2680 daily; after 1941 the caloric content of the diet rose to 2800, and a subsequent investigation revealed a return to the peace-time figure for weight loss. The annual death-rates present a similar picture—68 per 1000 for 1935–39, 91 per 1000 for 1941, and again 68 per 1000 for 1944. In the last war there was an increase in the death-rate right through the war, culminating in a figure of 207 per 1000 for 1918; this was followed by a fall immediately after the war. Dr. Rees Thomas suggested that the more favourable figures for this war were primarily due to a better diet, and he recalled that the food was blamed as the chief detrimental factor by the Commission on Diet in Mental Hospitals after the last war. The actual dietaries in about two-thirds of the mental hospitals in the country have recently been assessed from the issue books of the clerks and stewards, since actual intake values are impossible to obtain. It was found that 68% of the patients received a diet containing 2360 calories; the rest received supplements either because of the work they did or for reasons of physical illness. In Dr. Rees Thomas's opinion a diet containing 2500 calories is adequate for the mental hospitals in view of the age and activity of their population. The diet in a mental hospital can now be maintained at a reasonable level without great difficulty, thanks to the efforts of the Ministry of Health and the Ministry of Food.

Dr. H. E. MAGEE said that the Medical Research Council committee on special diets, which advises the Ministry of Food on invalid rations, has not recommended any special priorities for mental patients as such. Mental hospitals can, however, obtain an extra allowance of fish like other hospitals. The requirement of the mental patient will vary with the amount of muscular exercise he takes as well as with the nature of his condition. Thus melancholic types require considerably less than excitable ones. The beneficial effect of food and especially of frequent snacks during the air-raids taught us that mental excitement and tension demand a high-calorie diet. Under the present rationing system—it is possible to provide a diet containing 3000 calories for men and 2200 for women, provided intelligent use is made of point foods and the rationed foods are supplemented with unrationed foods such as bread and potatoes. Unrationed foods provide a good deal of protein; this protein is mostly of vegetable origin, but there is no evidence that animal protein is indispensable for adult man. It is sometimes said that war-time diets, especially in hospitals, are too starchy, but a person getting sufficient calories from the rationed and unrationed foods available can scarcely avoid eating enough protein, as well as vitamins and minerals, in his diet: our war-time food policy was so planned. In liberated Europe frank deficiency disease has been strikingly rare, but progressive asthenia, apathy, listlessness, lack of attention to personal hygiene, and lack of interest in the surroundings are general. Insufficient food blunts the desire to live, while adequate feeding tends to restore it. The lesson for psychiatry of this observation is obvious. In conclusion, Dr. Magee mentioned the observations made in a mental hospital in Paris in 1942–43 by Randoin. There 2877 calories were consumed daily and the annual death-rate was 10% before the war. In 1941–42 the calorie intake fell to 1750 and the annual death-rate rose to 21%. The patients lost up to 5 kg. in 6 months, but when in 1943 the diet was increased by 25% the losses in weight were restored in 6 months.

Prof. J. R. MARRACK maintained that the requirement for calories is greatly overestimated. He himself can lead a very active life on 2300 calories daily. For the mental-hospital patient 2400 calories is quite enough. With regard to vitamin C it is very difficult to get more than 20 mg. per day in the diet, and most people probably get less, because foods rich in vitamin C, such as mustard and cress, are very bulky. Raw vegetables are difficult to eat for people with bad teeth. Vitamin C is especially poor in restaurant meals. White bread is deficient in vitamin B_1, but fortification may be dangerous by upsetting the balance of B vitamins in the diet. Prof. Marrack asked whether mental patients are more susceptible to B deficiencies than other people; this may be the reason for the higher standards of Williams, arrived at on the basis of experiments with mental patients.

Dr. S. W. HARDWICK discussed the cases of pellagra he has seen during recent years and pointed out that this disease can easily be missed in hospital patients. He emphasised the importance of acute nicotinic acid deficiency psychoses of the Cleckley-Sydenstricker type.

Dr. JOSIAH OLDFIELD discussed the digestive powers of the organism in relation to the availabity of nutrients. He was not impressed by arguments based on the monotony of diets, since horses and other animals thrive on monotonous diets.

Dr. ROLF STRÖM-OLSEN discussed the administrative difficulties in the provision of an adequate and varied diet in mental hospitals, and mentioned a dramatic outbreak of scurvy (36 cases) at his hospital.

Dr. P. ELLINGER said that the position with regard to diet and pellagra seems rather confused, and discussed some of the aspects of this problem in the light of recent discoveries on the biosynthesis of nicotinic acid in the human gut. A comparatively simple test is now available for the assessment of the nicotinic acid status of patients.

Mr. R. BENESCH discussed the pathogenesis of pellagra and vitamin deficiencies in general from the point of view of the availability of these factors to the human body, as distinct from the dietary content. He analysed the reasons for the relative frequency of vitamin deficiencies in mental hospitals in the light of vitamin synthesis and destruction in the gut and the influence of diet, infections, and therapeutic preparations thereon.

The CHAIRMAN wound up the meeting by appealing for an increased number of dietitians in mental hospitals.

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Reviews of Books

Rehabilitating the Tuberculous

F. R. G. HEAF, M.A., M.D. Camb., M.R.C.P., senior medical officer, L.C.C., consulting physician to Papworth Village Settlement and to the British Legion Village Sanatoria; J. B. MCDOUGALL, C.B.E., M.D. Glasg., medical director, British Legion Village Sanatoria; Nayland, Essex, and Douglas House, Hampshire. (Faber. Pp. 142. 8*s*. 6*d*.)

Pathways in Aftercare

A verbatim report of a discussion on aftercare and reablement for tuberculous patients. (National Association for the Prevention of Tuberculosis. Pp. 37. 5*s*.)

BOTH these publications help to solve the major problem of tuberculosis—the patient's livelihood after he leaves the sanatorium. Both proclaim that "rehabilitation should be considered as an essential part of the treatment of tuberculous persons."

Dr. Heaf is a senior medical officer of the London County Council and consulting physician to both Papworth and Preston Hall; Dr. McDougall, for many years medical director of Preston Hall, has recently undertaken in addition the direction of Nayland in Essex and Douglas House in Bournemouth. These two authors therefore have wide experience and know exactly what they are talking about. They present their observations lucidly and convincingly, and it is heartening to learn how much has been, and is still being, accomplished at village settlements such as they describe. As their patients near the end of their sanatorium treatment, their tolerance for exertion is assessed and tested on a suitable productive job which earns them real wages; as their tolerance increases, their industrial wage-earning value increases pari passu until they are self-supporting. Living in the village settlement they and their families (and it has been proved that they can rear perfectly healthy children) remain under constant medical supervision. At the slightest suspicion of deterioration in health, they are encouraged to lie up. Far from promoting hypochondriasis, this watchfulness creates confidence, and the "lie-ups" are amazingly rare—a matter of a few weeks in about as many years. The income level of the workers appears to be as high as in industry elsewhere. At Preston Hall in 1944–45 the wages and salaries earned by ex-patients living in the village amounted to £25,000, and the gross annual turnover of the industrial section came to about £300,000.

But these village settlements are few, and can only accommodate patients from neighbouring areas or those willing to migrate from their native locality, leaving friends, neighbours, climate, scenery, and patois behind. Is the solution to the problem of reablement a multiplicity of village settlements throughout the land? Or can the man who recovers from tuberculosis be absorbed safely and economically into industry and remain under domiciliary supervision in his own home? The second volume, *Pathways in Aftercare*, is a verbatim report of a discussion on this very point. The group was assembled at the invitation of the N.A.P.T. under the chairmanship of Dr. Heaf and was attended by a large number of industrial managers, representatives of local authorities, tuberculosis officers, and welfare workers, many of whom took part in a realistic and illuminating debate. Naturally enough no final solution was reached, but the speeches leave no doubt that the problem of fitting the tuberculous patient into the right job in the right way is being tackled more wholeheartedly now than ever before.

No sanatorium physician, tuberculosis officer, or local authority can afford to miss reading these two books.

Traitement chirurgical de l'arthrite sèche de la hanche

L. TAVERNIER, professor of the practice of pædiatric surgery and orthopædics; Ch. GODINOT, director of the Clinic of Lyons University. (Masson. Pp. 360. Frs. 150).

Professor Tavernier gives his records of 108 patients with osteoarthritis of the hip on whom he has operated in the last twenty-five years. He has tried to relieve pain by limiting the hip movement by arthrodesis, then later by arthroplasty, insertion of metal cups, remodelling of the head of the femur, and removal of osteophytes. In 1930 he first tried the operation of *forage du col*, and in 1934 he tried section of the branches of the obturator nerve which supply the hip-joint. His technique is based on the anatomical researches of his assistant Truchet. He claims that 58 patients have been treated successfully by simple section of the articular branches. Sometimes, although the pain radiating to the anterior and medial aspect of the limb was relieved, pain in the lower back and outer aspect of the thigh persisted. This area proved to be supplied by a branch of the sciatic nerve, and section of this branch relieved pain. Since 1942 he has operated on 23 patients with a high proportion of success: they not only were relieved of pain, but they moved more easily and there was improvement in the X-ray appearance of the joint.

This small book describes in detail the evolution of the methods employed by a thoughtful surgeon. It is worth reading for its sincerity, clarity, and logic.

Applied Physiology

(8th ed.) SAMSON WRIGHT, M.D. Lond., F.R.C.P., John Astor professor of physiology, University of London. (Oxford University Press. Pp. xxx + 944. 30*s*.)

THIS edition has been expanded by 150 pages and as many illustrations. The reader is exhorted to make intelligent use of the latter, and is shown in an appendix how to do so. Other pictures have been improved, and the man in chapter v with dermatographia has joined the Merchant Navy, proclaiming in blistering capitals "There'll always be an England." These changes and their like are good, and the way in which the text has been brought up to date is praiseworthy. An instance, to which attention is not drawn in the preface, is the section on the spleen, in which the illustrations are admirable and the treatment more coherent than before. There is a wealth of fact about human physiology, and a good system of cross-references. The book is an admirable and logically constructed compendium of what the student or physician needs to remember and understand of his physiolcgy. A great deal more can be obtained from it by study than is apparent at a first reading. We miss with regret Solomon's advice to the too credulous reader which used to salt the fly-leaf. To substitute observations on how a textbook should be, and how it usually is, written is doubtful wisdom. As a prematurely immortalised epigram [1] says, "The printed page is not the truth nailed down, but the author." We can approve what is revealed of this author and his businesslike approach to the subject, without perhaps wishing that all books were written in the same way.

Voluntary Health Agencies

An Interpretative Study. SELSKAR M. GUNN; PHILIP S. PLATT, with a foreword by LOUIS I. DUBLIN, PH.D. (Ronald Press Co. Pp. 364. $3.)

THIS book presents the results of an inquiry, beginning in 1941 and extending over 3½ years, into the work of the numerous voluntary health agencies in the United States. It was undertaken on the initiative of Mr. Louis I. Dublin by a committee, of which he became chairman, appointed by the National Health Council with the financial support of the Rockefeller Foundation; and its object was to find out what the respective agencies were doing, how they were doing it, what were their problems and difficulties, and what their achievements—especially in relation to their expenditure. The agencies, which were so defined as to exclude hospitals and clinics, numbered about 20,000, and the inquiry was the first attempt to give a comprehensive view of their activities. It shows, broadly, that though much important and valuable work in being done by voluntary health associations in America, "the time is ripe for stocktaking." There is, it is stated, need for improved organisation, for advances in leadership and technical direction and adaptation to changing requirements, and for more coördination of effort especially with the work of the official health authorities. To help in the attainment of these objectives the authors give much practical advice, which, being founded on long experience of health administration, should be useful both to members of the governing bodies of health agencies and to their administrative staffs. The book, written with a light touch, is remarkably readable, and may confidently be recommended to those engaged in voluntary health work in this country.

1. Fabing, H., Marr, R. Fischerisms. Springfield. A private print.

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THE LANCET

LONDON: SATURDAY, JANUARY 5, 1946

"Direction"

"Doctors should, like other workers, be free to choose the form, place, and type of work they prefer, without Government or other direction."

So runs the sixth of the series of "principles" formulated by the Negotiating Committee as a yardstick against which the proposals for a National Health Service are to be judged. Prof. J. A. RYLE in last week's *British Medical Journal* takes exception to this criterion, which he regards as claiming "the right to perpetuate a state of affairs in which the underprivileged and under-doctored sections of the community must remain inadequately served." He argues that "there is no other answer to the problem of distribution of doctors than some measure of direction." One could wish, however, that he had given an indication of the form and extent which he thinks the measure of direction will need to take. For this word "direction"—loosely used, and used in advance of any exact knowledge of the Minister's intentions—is fast becoming a rod with which to belabour all proposals which involve any form of planned change in the geographical distribution of practitioners. Yet everyone admits that the present distribution is unfair and is conditioned rather by economic opportunity than by clinical need. The country has been promised a medical service available to every citizen who cares to use it, wherever he may reside. Moreover, an appreciable part of the cost of this service is likely to be met by direct weekly contributions from every family purse. No Government setting up such a service could evade the responsibility of ensuring that every part of the country shall receive its appropriate share of the available medical care and skill. It is not enough to say that the remedy is to increase the number of doctors unless at the same time some method is devised to ensure that the doctors are employed where they are most needed. This problem needs to be solved, and instead of confining ourselves to destructive criticism we should consider what solution would promote a better distribution without encroaching unduly on our present habits.

What is lacking in the areas at present "under-doctored"? Certainly they are in no way the healthiest localities. They could easily fill with useful work the days of many more practitioners than they now employ. But hitherto the remuneration they have been able to offer has been insufficient unless the doctor has been prepared to undertake the care of an undesirably large number of patients; nor have they offered good conditions for working, for living, or for bringing up a family. Given time, all this could under a National Health Service be materially changed. Financially the situation might improve very quickly. Once the Government takes responsibility for providing a medical service for all the people, there should be an end of underpaid or unpaid service to the poor, and of bad debts, and a satisfactory income should be attainable without the doctor attempting anywhere the care of an excessively large practice. Unattractive working conditions should also disappear as soon as modern health centres can be provided with good equipment and full ancillary assistance. It will not be so easy to meet the competition of the more favoured localities in the provision of good housing, educational, cultural, and recreational facilities, but compensations might be offered in the form of longer holidays, more frequent study leave, and perhaps earlier retirement. A National Health Service should also be always willing to facilitate the transfer, after some years' work, of any doctor who wants to move to another area.

But although the disadvantages of the under-doctored areas could thus be mitigated, and practitioners could be attracted to places now unpopular, it might be many years before the full effect of these changes would be felt; and we have to face the question whether any further steps could acceptably be taken to encourage an earlier redistribution. This term does not of course mean the movement of established practitioners from a place well supplied with doctors to one not so well supplied. So drastic a step, interfering, as it would, with countless doctor-patient relationships, has never anywhere been seriously suggested. Even in the white-paper, in the passage which first raised this controversy and led to the charge that the Government was seeking to direct medical labour, it was laid down that "there will be no interference with the right of a doctor to go on practising where he is now, and to take part in the public service in that area." It is in the interest of our patients that we should insist that there shall be no repudiation and no whittling down of this right; but we must also recognise that in the case of doctors newly coming into practice the position is different. The white-paper went on to say: "but an unrestricted right to any doctor to enter any new practice and there to claim public remuneration, at his own discretion, would make it impossible to fulfil the new undertaking to assure a service for all." Because of this, powers were suggested for the Central Medical Board which would have made it necessary for "any practitioner wishing to set up a new—or take over an existing—public service practice in a particular area to seek the consent of the Board."

This proposal was regarded by many of us as reasonable, but its object might perhaps be attained more comfortably. Instead of requiring all doctors who wish to enter new practice to apply for permission, it should be sufficient to designate from time to time areas (probably not numerous) which are held to be more than sufficiently supplied with doctors, and to ask only that doctors wanting to enter these areas should make out a good case in favour of their doing so—e.g., for reasons of health, or the desire to succeed to a family practice. Such partial "freezing" of certain areas that are well supplied with doctors, might without undue hardship modify distribution in the way required. Would the doctors whose choice was thus curtailed think that they were being "directed" as to where they should practice? We believe not. Experience shows that members of the profession do not in these matters make unreasonable demands. It is true that up to now, they have, like other workers, been free, in time of peace, from all

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Government direction, when choosing their type or place of work. On the other hand they have, again like other workers, always been subject to a form of economic direction. They have had to find work where work was available. A doctor may have wished to settle, say, at Taunton, but finding no suitable practice on offer he may quite cheerfully have accepted another at Bristol, if the practice, the house, or the partners there attracted him. It is not likely to have occurred to him that he had been "directed" to Bristol by the inability or unwillingness of the doctors of Taunton to make room for him in their town: he has recognised that in Taunton at the moment there was no demand for an extra doctor, and he has looked elsewhere. Had he not wished to go to Bristol, there were many other localities from which to choose, and there is no reason why under a National Health Service he should not still have a wide range of choice and avoid any sense of being "directed."

If in the interest of an improved service we can consent to such a conception as this, we shall be in a stronger position to resist the two things we all steadfastly desire to avoid—an initial posting, or a subsequent transfer, of a doctor anywhere, regardless of his wishes. Were such posting or transfer proposed, it really would merit the name of direction. We believe—and we hope Professor RYLE will agree—that under the arrangements here suggested all measure of direction could and should be avoided.

Carried Forward

THE year 1945 ended in the defervescence of war and a dress parade of cheerful statistics about the nation's health. The Ministry of Health report[1] a striking improvement in maternal mortality and in the whole range of infant deaths, including stillbirths and even neonatal rates. In the year ended March 31, 1945, the general death-rate achieved a new low record, and the birth-rate climbed up to 18 for the first time in nineteen years. For the third year in succession there was a substantial decrease in diphtheria, both cases and deaths, the deaths having fallen below 1000 for the first time in our history. It is true that there are shadows over the landscape—notably tuberculosis and venereal disease—but the broad general picture drawn at the end of a long devastating war is encouraging. To the Ministry of Health, long trained in habits of caution, these bright statistics

> "Do take a sober colouring from an eye
> That hath kept watch o'er man's mortality."

In other words, they answer:

1. Don't assume that the favourable trend will continue.
2. Don't attach too much significance to records of a single year.
3. These statistics, good as they are for the fifth year of a bitter war, are not good enough. They can and must be made better.
4. Look at the vast amount of ill health which limits and handicaps the daily lives of the workers—during an average quarter six out of every ten civilians of working age suffered from an illness (not necessarily keeping them away from work) or complained of a minor ailment of some kind.

In spite of these and other salutary cautions we might be justified in telling the world that we have a credit balance in our public-health account. The real question is how we are to maintain it during the years ahead. It all boils down, you will say, to full employment, better distribution of wealth and of nourishing food, and so on; you will have more difficulty in adding "better housing" because we have been worse housed during the war, in Southern England at any rate; yet the improvement has been as great there as anywhere.

In some directions the roads to improvement are clearly marked. The general notification of venereal diseases, with effective early treatment under ideal conditions (such as one finds in Chicago), would be a good beginning. In the attack on tuberculosis the immediate problem is to provide prompt institutional treatment for all who need it. The most urgent difficulty is lack of nursing and domestic staff; for that reason the number of beds for the tuberculous actually fell by 650 during the year 1944–45. But ultimately the campaign must be directed towards prevention and early detection of the disease. For detection the introduction of mass radiography offers good prospects. Prevention brings in the far wider issues of housing and poverty; but public education has an immense part to play, and we have not yet travelled very far along that highway. Although periodic variations in the incidence and virulence of infectious diseases are well recognised, there is no reason to doubt that our intensive campaign of immunisation against diphtheria has been effective. We must make unremitting efforts to develop and improve our methods, with all the earnestness of a mission and all the skill of modern publicity. Great scientific advances in immunisation are just round the corner.

When we turn from specific diseases and examine the current records of health, there is some conflict of evidence about the speed, and even the direction, of progress. The enlightened policy of the Ministry of Food, on the advice of men of science, went far to prevent deterioration in our nutrition during the war. How are we to hold fast, when controls are removed? YUDKIN and others point out that in many families war-time increases in wages have not kept pace with the rise in the cost of living, and that the poorer families show a higher incidence of nutritional deficiencies. TITMUSS went further by demonstrating that the lower-income groups are *relatively* poorer today than they were a generation ago—that is, the gap between wealth and poverty is wider—although all classes have shared in the general decline in mortality. He also made it clear that the major causes of this increasing divergence were casualties of environment. The same tendency can be observed in the United States. Its correction requires our constant vigilance. From the medical point of view this means that we must continue to undertake scientific surveys of the health, food, and income of the various groups and be ready to urge State intervention before harm is done.

The birth-rate was steady or increasing up to 1876, when the figure of 36·6 per thousand was reached; since then there has been an almost uninterrupted decline, and the gross fertility of British women has fallen by about 60% in half a century. The death-rate reached its unenviable height about 200 years ago, at about 47, and has since declined fairly steadily to below 12 per 1000 of the population.

1. Summary Report of the Ministry of Health for the year ended March 31, 1945. See *Lancet*, Dec. 29, 1945, p. 856.

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These figures are sufficiently accurate to allow us to discuss the meaning of the change. In the earlier period one of the chief causes of the great increase in population was the rise of modern medicine, both preventive and curative. The present age has witnessed another great revolution in medical treatment, and full credit should be given to the sulphonamides and penicillin, to blood-transfusion and modern surgical techniques. A large number of killing diseases have been themselves disabled.

Much of the ill health that plagues us is no doubt due to fatigue and nervous strain—and no wonder. The remedy lies in shorter hours of work and less sense of rush. "Everyone is in motion," TOCQUEVILLE said; "some in quest of power, others of gain. In the midst of this universal tumult, this incessant conflict of jarring interests, this continual striving of men after fortune, where is the calm to be found which is necessary for the deeper combinations of the intellect? How can the mind dwell upon any single point when everything whirls around it, and man himself is swept and beaten onwards by the heady current that rolls all things in its course?" There is need for personal as well as national peace. And perhaps men and women can learn to smoke less and drink less alcohol, now that the war is over. When TITMUSS demonstrated that the lower-income groups are relatively worse off today, and that the causes of this widening gulf are mainly environmental, he was stating a truth that is often overlooked. The mighty tide of sanitary improvement which has been flowing for two generations has not yet reached the very poor. A good water-supply is of benefit only when it can be turned on, hot or cold, inside a house; modern drainage is a blessing only when the sanitary fittings are not the common property of several families; and milk remains wholesome only when it can be kept in a cool place. The list might be multiplied until the evils of the slum are described in all their ghastly detail. But housing alone is not enough. The slum is the outward expression of poverty and ignorance. Any real effort to make a healthy nation must provide houses, but it must also attack the deeper problems, of poverty by economic action, and of ignorance by education; or it is of no avail.

Intensive Treatment of Bilharziasis

THE specific treatment of human schistosomiasis dates from the independent announcements by MCDONAGH and by CHRISTOPHERSON, in 1915 and in 1917, of the lethal action of antimony on the causative intravascular parasites. They first successfully treated cases of blood-fluke infestation with tartar-emetic solutions given intravenously. Since then both potassium antimony tartrate and sodium antimony tartrate have been extensively employed, and these drugs are today still generally held to be the most potent available for the treatment of human bilharziasis. The accepted maximum single dose of either, for an adult, has been about 2 grains; and this dose has been repeated not more frequently than on alternate days, until a total of about gr. 30 of the selected drug has been reached. The full course of treatment extended over about three weeks. In addition to the length of the course it has disadvantages which are attributable to the very toxic and extremely irritant nature of the compounds. It is usual to begin with a small dose (gr. ½) and to increase slowly until the full dose is reached, when it is repeated for the requisite number of injections. With each injection toxic side-effects, such as a feeling of constriction in the chest, spasmodic cough, vomiting, pains (especially in the shoulders), cramps, and sometimes collapse due to a fall in blood-pressure, are encountered; these may be severe and distressing and occur while the solution is actually being introduced. The solution of the drug must be freshly prepared immediately before use, since it becomes more toxic on standing, and it must be given with the utmost care into the vein, without any leakage around the site of injection, or distressingly painful necrosis going on to actual gangrene may result. It is thus evident that the administration of tartar emetic over some weeks is not lightly to be undertaken.

The pentavalent antimonials have proved ineffective in the treatment of schistosomiasis; and before the trivalent antimonial compounds were introduced the only alternative to tartar emetic was the alkaloid emetine, which proved useful in cases where intravenous injections could not be given, or where the patient was highly intolerant to antimony. In 1929 the organic trivalent antimony preparation, 'Fouadin' (stibophen), was found to be effective in the human schistosomiases. This drug, which contains 13% of antimony, is put up in solution in ampoules, and is non-irritant and relatively non-toxic. It is stable in solution, and the contents of a 5 c.cm. ampoule can be injected intramuscularly or intravenously without undue inconvenience to the recipient, and the dose can be repeated at shorter intervals than considered advisable with tartar-emetic solutions. In this issue MILLS records his treatment of *Schistosoma hæmatobium* infestations in West Africans with stibophen (B.P.) and with 'Anthiomaline' (M.&B.), a lithium salt of antimony. Each drug was given intramuscularly for six days each week over a period of a fortnight. Such courses have been successfully employed by many workers, and MILLS records 42 cures in the 46 cases he treated and was able adequately to observe for a reasonable period afterwards.

Some months ago ALVES[1] in a preliminary note reported the successful treatment of a few cases of schistosomiasis with full doses of sodium antimony tartrate frequently repeated within a period of only two days. Now he and BLAIR record in detail the similar treatment of 100 cases of *S. hæmatobium* and *S. mansoni* infections in natives of Southern Rhodesia. Their therapeutic results are excellent, and the absence of toxic side-effects, with a proper technique of injection, is remarkable. What is even more striking is the dramatic shortening of the period necessary for adequate curative treatment, with its bearing on the mass treatment of the populations of the schistosomiasis endemic and hyperendemic areas. Mass treatment of any large community is complicated not only by the number of skilled personnel required, and the amount of energy, time, and money that must be expended, but by the reluctance of the average person to continue any long course of treatment to the end. This characteristic is not confined to the backward peasant inhabitants of Africa and Asia but is daily seen in their more educated

1. Alves, W. *S. Afr. med. J.* 1945, **19**, 171.

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Caucasian brethren. A successful two-day course of intensive treatment for a chronic and uncomfortable disease may well appeal to a primitive population and can the more readily be enforced where compulsion is necessary. If only from this aspect the results of ALVES and BLAIR are an important contribution to the welfare of the native inhabitants of the schistosomiasis endemic areas throughout Africa and Asia.

Clinician and Scientist

THE regius chair of physic in the ancient University of Cambridge was founded in 1540. For four centuries it has been held by a succession of physicians. Some, such as WINTERTON and WARD, were preeminently scholars. Some, such as GLISSON, were original investigators. Almost all were men whose training and whose life-work were in the practice of medicine; they were, in the modern term, clinicians. In the twenty-second appointment to the office this old tradition has been broken. Sir LIONEL WHITBY is but an occasional visitor to the bedside; his practice, tastes, training, and original work have been in the scientific, rather than in the clinical field. It is not surprising then that he devoted his inaugural address on Dec. 5 to the familiar but baffling task of describing the relation of the science to the art of medicine.[1] He had no difficulty in impressing his hearers with the immense contribution of medically useful knowledge that science has made. His apt review of chemotherapy, stretching from the empirical discoveries of quinine, mercury, and antiscorbutics, through EHRLICH'S dogged search for the "magic bullets" that his scientific imagination believed must exist, down to the modern stories of the sulphonamides and penicillin, was a reminder of the speed at which human intellectual activity is altering man's relation to his environment; yet it dealt with only one limited field of scientific inquiry in relation to medicine. Beyond its contribution of useful knowledge, however, science can influence the practice of medicine by affecting the physician's way of thinking in his daily approach to patients and clinical problems. How far it does so, how much further it ought to do so, and what are the hindrances; these are the difficult questions.

Anyone familiar with the atmosphere of our teaching hospitals must recognise that the clinician's habit of thought and that of the laboratory worker are not alike. Sometimes they differ so much that discussion between them becomes futile and antipathy is engendered. The laboratory worker loses patience with the clinician's ignorance and unwillingness to learn, his woolly-mindedness and credulity. The clinician concedes the laboratory worker's precision, but is irked by his narrow outlook and hint of intellectual superiority. Yet both, for generations, have been trained in the same scientific laboratories, of chemistry and physics, anatomy and physiology. Why is it that, twenty or thirty years later, they cannot talk the same scientific language? The answer is that they do not appreciate the limitations, as well as the possibilities, of the application of scientific thinking to clinical medicine. The scientist asks his questions, plans and performs his experiments, and may or may not get his answers; if he does not solve his problem, he postpones it, or abandons it, disappointed but not discredited; new knowledge or new technique may bring the solution later on, or perhaps it was not worth solving. To the clinician, on the other hand, every patient is an urgent problem; none can be abandoned or postponed. Some decision must be taken and acted on, however scanty the knowledge on which it can be based. Being obliged, so often, to act without precise indications of how to act readily blunts the logic of all but the sharpest intellects. This common experience is an explanation, though it need not be taken as an excuse, for imprecision in the clinical mind. A second and more fundamental difference in ways of thinking arises out of the infinite variety of patients and the problems they present. WHITBY recognised this in saying, "it is true that medicine will never be an exact science, because the normal variations in individuals have such a wide range that automatic and mechanical treatment is prohibited." The scientist seeks generalisations, at all stages, from the simple classifications of natural history to the comprehensive "laws of nature"; his experiment gives him no satisfaction unless he knows he can repeat it and obtain an identical result. The physician's goal is the restoration or preservation of the individual's health, and every success is satisfying although it may be unique; with him the generalisations are a means but not an end. We cannot therefore expect or desire that clinician and scientist should think along identical lines or talk quite the same language. But that need not imply antagonism. WHITBY was right and opportune in saying again that "the welding of art and science will make for good medicine." It must come through a mutual recognition, by clinician and scientist, of the differences in their background and in the nature of their tasks, and a mutual respect for the contribution each can make to the problems of innumerable bedsides.

1. The address will be published by the Cambridge University Press.

New Year Honours

THE first major list of honours to be issued since the end of the war is concerned almost entirely with contributions to victory. No such list can include more than a representative sample of the many men and women who have shown exceptional ability, endurance, or devotion: for every person honoured in war, there must be twenty, fifty, or a hundred equally deserving in their own way. But the fact that relatively few are chosen need not and should not reduce our pleasure at their recognition. It is in fact a great pleasure to see among the new knights the names of so many men long honoured by their colleagues—among the surgeons Fairbank, Gordon-Taylor, Max Page, W. H. Ogilvie, Stanford Cade, and Henry Wade; among the physicians A. M. H. Gray, R. A. Rowlands, A. W. Stott, and C. P. Symonds; and a bacteriologist of the distinction of Paul Fildes. The outstanding success of Sir Alexander Hood as director-general of Army Medical Services brings him promotion to G.B.E., while other administrators raised to knighthood include J. B. Hance, director-general of the Indian Medical Service, and R. B. Ainsworth, director of medical services of the Red Cross Joint War Organisation. Outside the strict confines of medicine we are glad to note that Prof. A. V. Hill, F.R.S., becomes a Companion of Honour. In the hospital world Lord Southwood, chairman of Great Ormond Street Hospital, is created a viscount, and Mr. Philip Inman, chairman of Charing Cross Hospital, becomes a baron. A supplementary list will be published shortly. Meanwhile, at the beginning of a New Year of better hopes, all of us will gratefully congratulate those members of our profession named on p. 30.

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Annotations

NEW REMEDY FOR LUPUS

In 1943 Dr. G. B. Dowling at St. Thomas's Hospital began to treat lupus vulgaris with large doses of calciferol (vitamin D_2) by mouth. At meetings held by the section of dermatology of the Royal Society of Medicine in the past two months he and Dr. E. W. Prosser Thomas of the same hospital have described remarkable results obtained in some of the 38 cases so far treated in this way, 16 of which have been followed for more than a year. Some of them had previously had X-ray therapy, and in these it has been harder to judge the response to the new remedy; but Dr. Dowling thinks it fair to say that all have improved under calciferol, and in a dozen the lesions seem to have entirely disappeared. In one patient there has been no return of the disease in the 18 months since treatment stopped; and though a few have shown little benefit, the majority have been strikingly improved by calciferol when they had made poor progress with other remedies. Members of the dermatological section, who saw some of the cases, were much impressed; and it was pointed out that the new form of treatment is far simpler and less expensive in time and effort than current methods such as frequent exposure to Finsen light or ultraviolet rays. On the other hand it has the disadvantage of employing doses which border on the toxic, and at least 8 patients have shown signs of intolerance such as nausea, loss of appetite, and depression. Most of these, though not all, were receiving 150,000 international units of calciferol daily, and in all of these symptoms of intolerance disappeared when the dosage was reduced to 100,000 I.U. Unlike the natural vitamin D_3, obtained from fish-liver oils, calciferol is prepared artificially by irradiating a vegetable sterol, ergosterol, and preparations may include other toxic by-products of irradiation. Very large doses are known to cause deposition of calcium in soft tissues—notably the renal tubules and arterioles and the media of large blood-vessels—and though this abnormal calcification tends to disappear on discontinuing the use of calciferol, dosage on the scale used by Dowling and Prosser Thomas for lupus should not be employed without carefully considering the individual case and keeping a watch for toxic symptoms. This aspect of the subject is discussed more fully in the report of the November meeting to be published in the December issue of the *Proceedings of the Royal Society of Medicine*, now in the press. The meeting held on Dec. 20 will be reported in a later issue of the society's proceedings.

ORGANISERS AND THE GROWTH OF BONE

By publishing short reviews of recent papers, *Nature* is doing its best to bring us up to date with scientific research on the Continent during the last five years. Professor Lacroix of Louvain has in this form summarised [1] eight of his war-time papers on the growth and morphogenesis of bone. The transplantation of small cubes of purely cartilaginous tissue from the growth cartilages of rabbits' rib and radius to the brain or kidney capsule of other rabbits led to the formation of ectopic lamellar bone. Fibroblast cells gathered round the transplanted cubes just as they do around the ossification groove of growing long bones—a "typical induction phenomenon" is Lacroix's comment. Hyaline cartilage from the rib, transplanted to the upper extremity of the tibia of another rabbit, was assimilated to the tibial growth cartilage and became in due course the seat of a typical endochondral ossification. Lacroix described this as an instance of assimilatory induction; and his belief in "the existence in the growing cartilage of an organiser" seemed to be confirmed by finding that alcoholic extracts of the long bones of newborn rabbits, injected into the thigh muscles of other rabbits, led to the formation of fairly well differentiated depots of ectopic bone. To the causal agent he has given the name "osteogenin."

None of these results will surprise those familiar with the experimental production of ectopic bone: gall-bladder and urinary epithelium will do as much.[2] The use of the terminology of "organisers" and "induction" is a gratuitous complication. An embryonic inducing substance is a contact hormone with a fairly high degree of specificity of action which shunts the developing cell into a pathway of differentiation which is thereafter indefinitely maintained in cellular heredity. Not every causal stimulus qualifies: an ill-fitting shoe does not organise blisters, nor does an enzyme act as organiser for the end-products of its action. *Nature's* summary, though it is by the author himself, gives no hint of the part that phosphatase may play in bone-formation—a part suggested so long ago as 1923 by Robison, and strikingly confirmed by Blum's [3] demonstration of the formation of ectopic bone in muscle by the injection of kidney phosphatase together with an appropriate substrate for its action. (Nor does Lacroix mention the fact that fibroblastic action is always particularly intense around tissue homografts, such as his own were.) Offered the right conditions, many cells of the fibroblast superfamily seem to be able to form bone. What more for this purpose can a fibroblast ask than to have phosphatase and substrate near to hand? The morphogenesis of bone is a subject just emerging from the penumbra of ad-hoc explanatory devices—"organisers" and the like. The less we *need* to hear of them the better; and in Lacroix's experiments there is really no need to hear of them at all.

AURICULAR FIBRILLATION IN MYOCARDIAL INFARCTION

A study by Askey and Neurath,[4] who have investigated the 84 cases of auricular fibrillation occurring in 1247 patients with myocardial infarction, suggests that in such patients the onset of fibrillation is of grave prognostic significance. Only cases where the arrhythmia was confirmed by an electrocardiogram were considered, and the recorded incidence of auricular fibrillation might well have been higher if transitory cases had been included. The most striking finding was that the case-mortality for the entire series during their stay in hospital (average about a month) was 51%, whereas in those with auricular fibrillation it was 80%. The case-mortality in patients with persistent auricular fibrillation was 89%, compared with 59% in those in which the arrhythmia disappeared. The time of onset of fibrillation had a profound effect on the prognosis. In 49 cases it was found in the first electrocardiogram done after infarction, and in only 2 of these did it later disappear; in 35 cases it developed subsequent to the infarction and in 27 of these the rhythm later became normal. In this latter group the prognosis worsened if the fibrillation lasted more than a day. Systemic embolic phenomena developed almost five times as often in the patients with auricular fibrillation as in those with sinus rhythm.

In view of these findings it is clear that whenever auricular fibrillation is detected in a patient with myocardial infarction an attempt should be made to regain normal rhythm. Askey and Neurath [5] compared the effects of digitalis alone, quinidine alone, and the two drugs in combination. For the entire group and for those without congestive failure quinidine gave the lowest mortality and the highest rate of return to sinus

1. Lacroix, P. *Nature, Lond.* 1945, **156**, 576.

2. Cf. Huggins, C. B., Sommet, J. F. *J. exp. Med.* 1933, **58**, 393; Bourne, G. *Quart. J. exp. Physiol.* 1943, **32**, 1.
3. Blum, G. *Lancet*, 1944, ii, 75.
4. Askey, J. M., Neurath, O. *Amer. Heart J.* 1945, **29**, 575.
5. *Ibid*, 1945, **30**, 253.

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rhythm, while in the group with congestive failure digitalis and quinidine combined gave the best results. Digitalis alone was unsatisfactory in both groups. Quinidine was found to be contra-indicated in the presence of conduction defects. It is therefore recommended that in patients with auricular fibrillation and myocardial infarction quinidine should be immediately administered, unless conduction defects are present. If the arrhythmia arises several days after the infarction and there is no evidence of congestive failure it is well to wait for twenty-four hours to see whether sinus rhythm returns spontaneously; if it does not, quinidine should be given. If congestive failure is present as well as auricular fibrillation, quinidine and digitalis should be given immediately. In cases where fibrillation coincides with the infarction, Askey and Neurath recommend atropine sulphate given hypodermically in an initial dose of gr. 1/50, followed by gr. 1/150 thrice daily. While their series is not large enough to permit of dogmatism, their evidence justifies a full trial of the measures they recommend. Careful note should be taken of the danger of giving digitalis by itself in such cases.

THE PREDIABETIC MOTHER

IT has long been recognised that where the mothers are established diabetics the fœtal and neonatal mortality rates are high and the infants born alive often show striking changes, such as increased birth-weight, hypertrophy of the heart, hyperplasia of the islets of Langerhans, and excessive extramedullary erythropoiesis. It seems that these changes may occur in infants whose mothers show no evidence of diabetes mellitus until after parturition. Thus Miller and his colleagues [1] found that the combined fœtal and neonatal mortality-rate in a group of diabetic mothers was 23·6% where the diabetes was manifest during pregnancy, compared with 35·4% where the child was born 1–5 years before the onset of diabetes and 11·9% where it was born 11–15 years before the onset. Comparable trends were found in the incidence of large babies: taking 5 kg. as the minimum standard for overweight, they found that only 0·07% of 20,219 infants born to nondiabetic mothers were overweight, compared with 3·9% of 256 infants born to prediabetic mothers, and 6·4% of 93 infants born after the onset of maternal diabetes. Miller [2] has carried the investigation a stage further. He finds that the mortality-rate among 253 infants born to women who developed diabetes after the age of 40 was 8·3% compared with 2·0% in a comparable group of women who did not develop diabetes. The mortality among the infants of prediabetic mothers was definitely related to the length of time between the birth and the onset of diabetes: among the infants born 16 years or more before the onset of maternal diabetes it was 6·0%, compared with 15·8% in those born 15 years or less before the onset. The difference in the average birth-weight was also statistically significant, being 3·53 kg. in the offspring of nondiabetic mothers and 4·15 kg. in the prediabetic mothers. This high birth-weight was not associated with maternal obesity, since the average birth-weight in a group of obese nondiabetic mothers was only 3·6 kg.

The significance of these findings is difficult to assess. They certainly show that maternal hyperglycæmia has little to do with the death of the fœtus a contention that has already been advanced by Miller [3] who reported 7 cases of infants showing all or most of the characteristic features of the child born of a diabetic mother, although none of the mothers gave any evidence of diabetes until after the birth of the child. A practical implication of this study is that the birth of an infant who is overweight or has macrosomia, cardiac hypertrophy, or abnormal extramedullary erythropoiesis may be the first sign of impending diabetes mellitus in the mother, and that women developing diabetes after the childbearing period are recruited almost entirely from that 5–7% of mothers who give birth to infants weighing more than 4 kg.

1. Miller, H. C., Hurwitz, D., Kuder, K. *J. Amer. med. Ass.* 1944, **124**, 271.
2. *New Engl. J. Med.* 1945, **233**, 376.
3. *Amer. J. med. Sci.* 1945, **209**, 447.

FIRST THINGS FIRST

MANY will be astonished to learn that of the 25 medical schools in Great Britain today compulsory courses in tuberculosis are arranged only in 9. At the others the student is at liberty to attend the local authority's clinics and sanatoria in his own free time. But so busy is he already, and so lukewarm is the encouragement, that he is quite likely to let the matter slide, and to see only those cases, usually advanced ones, which come his way in routine hospital practice, and which (or the like of which) he can expect to meet again in his final examination. It is not surprising therefore that medical practitioners on the whole are inept at recognising or even suspecting tuberculosis before it is blatant.

The Tuberculosis Educational Institute, an offspring of the National Association for the Prevention of Tuberculosis, draws attention to this state of affairs in a *Memorandum on the Teaching of Tuberculosis to Medical Students*. To remedy the defects, the institute's committee feel that the scheme put forward in the Goodenough report might advantageously be amplified, and they make the following suggestions:

(1) The physician in charge of the dispensary, and/or the medical superintendent of the sanatorium, might be appointed a lecturer on the staff of the medical school which may be situated within the region or area which the dispensary or sanatorium serves.
(2) All medical students must be attached to approved tuberculosis dispensaries as clinical clerks for short periods, during which they should also become acquainted with the technique and organisation of mass radiography.
(3) Facilities should be provided for short periods of residence at approved sanatoria for medical students who wish to make a further study of the subject.

It should not be impossible to act on these suggestions. Some of the many hours now given to watching surgical operations which most of the students will never attempt to perform, and to the study of rare and exciting conditions with no diagnostic or therapeutic urgency and with inexorable prognoses, might well be spared for tuition in a disease which in theory is both preventable and curable, but which in practice continues to exact a heavy toll of life and the fullness thereof.

REPORTING WORK ON CANCER

OF all fields of medical research, cancer is probably the slowest to yield a harvest. This is because the sole outward and visible sign or criterion of the disease is a tumour which takes much time to develop. It is true of course that rapid results are sometimes obtainable, but these usually relate to something other than tumour production by carcinogenic agents or tumour treatment by therapeutic agents. Most experimental work requires at least a year and probably far longer to mature, and it is only well-matured results that are of interest to the serious student of the subject. Hence the task of providing year by year, for an annual report, new results that will command widespread attention is in the nature of things almost impracticable. Would not a progress report every third year from any one centre or contributor afford a reasonable compromise between the investigator's need of freedom to meditate and the administrator's need of control of the expenditure of public funds?

Probably for the reasons we have mentioned, the results obtained in various departments of biophysics and of radiological physics appear the most impressive of those recorded in the 22nd annual report of the British

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Empire Cancer Campaign.[1] In these departments definite answers may now be given to certain well-defined questions. Thus the total absorption of energy in the body of a patient undergoing treatment by all types of radiation can be measured. So also can the dosage in body cavities, or the radon content of the air in luminous-dial factories. The report also shows, however, that new carcinogenic chemicals and new experimental animals have been found. To the already long list of growths caused by acetylaminofluorene may now be added tumours of the bladder in mice. It is useful to have an animal smaller than the dog for this study. Rats and guineapigs, previously resistant to skin cancer, have yielded to the surface action of 9 : 10-dimethyl-1 : 2-benzanthracene. Urethane is said to be responsible for an increase in the number of mice bearing lung adenomata.

It is no accident that for several years the statistical reports of the clinical research committee have been the most substantial contributions to the annual report. These are based on long-term observations, and are the product of several years of work. This year valuable data concerning the antecedents and results of treatment of 528 cases of cancer of the pharynx and larynx are recorded.

UNREWARDED RISKS IN INDUSTRY

BEFORE the war, as the Minister of Fuel and Power has lately reminded us,[2] the wages of coalminers ranked 86th among British industries; the great majority, according to Kuczynski,[3] earned less than the minimum family requirements laid down by Seebohm Rowntree.[4] To doctors, with old-fashioned ideas of equity, and accustomed to think of coalmining as the most dangerous of trades—first cause of fatal and non-fatal industrial accidents, and directly responsible for much ill health—this seems an odd arrangement. It is, however, but one expression of what is apparently a general truth: industrial wages in "normal" circumstances take little or no account of hazards to life and health, though "danger money" (in the Merchant Navy) and "dirt money" (at the docks) are, in a limited sense, exceptions to this rule. During the six years of war miners, as others, have earned more; recent figures[2] put their average rise in money wages at 95%.

A paper by Rothschild[5] correlates wages in 29 miscellaneous skilled and unskilled trades in social classes III–V with the standardised mortality ratios published by the Registrar-General in his Occupational Mortality Supplement.[6] The material is not very representative: textiles, coal and other mining, and black-coat workers are excluded; London wage-rates only are quoted; and no specific study of industrial accidents is attempted. (For these deficiencies the author should not be blamed. The often excessive difficulties of marrying social with medical statistics are, we trust, on the agenda of the new Central Statistical Office.) The results, nevertheless, are interesting and they confirm the general impression of the situation before the war. In the 29 trades there is no significant association between wages and occupational mortality. Such relation as does exist is in fact inverse: death-rates above the average tend to be associated with wages below the average. $r = -0{\cdot}26$, and when refined to exclude some of the general influence of social status as distinct from strictly occupational factors, $r = -0{\cdot}16$. Unfortunately, correlations with the mortality-rates of married women grouped by the occupation of their husbands are not included, nor are coefficients for each of the three social classes separately. Such contrasts as these are found in Rothschild's table:

Social class	Occupation	Average weekly wage (1925–36) in London (shillings)	Occupational mortality (adjusted for social class mortality)
III	Shipjoiners	68	56
III	Hand compositors	89	150
IV	Engine-shop labourers	46	133
IV	Railway firemen	66	76
V	Shipbuilding labourers	53	148
V	Navvies (civil engineering)	57 (on Dec. 31, 1936)	52

The problem is far from simple. Often we do not know whether differences in morbidity and mortality within the broad social classes are truly occupational in origin, and these differences deserve much closer inquiry than they have hitherto received. Again, in no society could the risks borne be the only, or chief, consideration in determining wage-levels. But it seems anomalous that "the bearing of these risks," in trades at similar levels of skill and responsibility, "is a service provided freely by the workers." "The reasons for this state of affairs," continues Rothschild, "are not far to seek. They consist partly in the ignorance of the workers as to the facts about risks, but the main factor is probably the impossibility for workers to move from one occupation to another or from one place to another, because they lack financial and other opportunities to do so and stand under continuous pressure to take up work quickly without waiting and weighing alternative possibilities." The ignorance, where it exists, might be overcome by the development, long overdue on many accounts, of medical departments in our great trade unions. Full employment as now projected demands that "the labour market should always be a seller's market rather than a buyer's market."[7] The measure of full employment already attained seems to be a powerful factor in the drift from the coal industry. Miners are well aware of their normally unrewarded occupational risks and of the very moderate success that has attended efforts so far made to reduce the hazards of coalmining.

THE MENTAL NURSE OF THE FUTURE

"We consider that the mental nursing service should be held to be comparable in status to any branch of the nursing profession."

THIS sentence sets the tone of the report of the Subcommittee on Mental Nursing and the Nursing of the Mentally Defective, appointed by the Athlone Interdepartmental Committee on Nursing Services.[8] The fact that mental nurses have so far not been held in the same esteem as men and women in other branches of nursing reflects on the public attitude towards mental disease and those who suffer from it. The report shows that some 16,400 women and 12,600 men are employed in the service. To stimulate recruitment and improve the quality of candidates the committee suggest that qualified mental nurses should be registered by a statutory body: registration on a supplementary part of the State register, as at present, is not satisfactory, and the position is further complicated by the alternative examination offered by the Royal Medico-Psychological Association. In the view of the committee the sole responsibility should rest with the General Nursing Council, subject to conditions to protect those now holding R.M.P.A. certificates. If this plan cannot be accepted they suggest that a separate statutory body shall be set up similar to the Central Midwives Board.

1. Report for 1945. Obtainable from the Campaign at 11, Grosvenor Crescent, London, S.W.1.
2. *Hansard*, Nov. 20, 1945, cols. 207 and 208.
3. Kuczynski, J. Hunger and Work, London, 1938.
4. Rowntree, B. S. Human Needs of Labour, London, 1937.
5. Rothschild, K. Institute of Statistics, Oxford, *Bulletin*, 1945, 7, 193.
6. *Decennial Supplement*, Part IIa, 1938.
7. Beveridge, W. H. Full Employment in a Free Society, London, 1944.
8. H.M. Stationery Office. 1s.

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The work of the mental nurse is exacting, physically and mentally. It is fitting that her salary should be maintained at a higher rate than that of the general-trained nurse. The 96-hour fortnight, which is regarded by the subcommittee as essential, might, we suggest, even be reduced in this branch of nursing. Other recommendations are what might be expected: recruits should be medically examined and radiographed before starting work, and examined again at yearly intervals; they should have at least a month's preliminary training before being admitted to the wards; the higher posts should be held only by nurses with double qualifications in general and mental nursing; superannuation schemes should be interchangeable, and nurses working in institutions for the mentally defective should have the same pension rates as nurses in mental hospitals; the ratio of nurses on day duty to patients—1 nurse to 11 patients—should be substantially reduced; and ward-maids should be employed. The subcommittee hold that all trained mental nurses should be entitled to live out if they wish, but the amount of living-out allowances is not discussed. Student nurses, it is agreed, should normally live in the nurses' home, or in quarters provided in the hospital; but they should be able to gain permission to live out if they can satisfy the hospital authorities that this is in their best interest. The old practice, still unfortunately current in some hospitals, of allowing the nurse to sleep "on the ward," so that she can be on call in case of emergency, is to be discontinued. Off duty, the nurse should have as far as possible the liberty of the private person, and the formation of nurses' councils is advised. Opportunities for recreation, and for the entertainment of friends, and better catering, should be arranged.

The great changes in mental treatment since the beginning of the century have brought the hope of recovery to many more patients, and a new interest to mental nursing. Our growing knowledge of the proper psychological management of the mentally disordered has made it essential that the women and men who undertake mental nursing should be intelligent, trustworthy, self-controlled, and instructed in their task. Recruits are scarce and drawn in many cases from the simpler rather than the more intelligent groups. Their courses of lectures, usually given by junior doctors whose interests lie elsewhere, are often sketchy and ill-suited to their purpose. The training of the mental nurse needs revising thoroughly, by those whose experience and knowledge qualifies them to advise. A new spirit in the nursing staff will come most quickly from a new spirit among the doctors teaching them.

SPECIAL DIETS IN CANTEENS

THE conference on special diets in canteens, arranged by the Industrial Welfare Society and held at the Central Middlesex Hospital on Oct. 18, may well be a sign of the times. It is usually social necessity that compels us to study the dietetic needs of any definable group of the population. Here it was the worker in industry suffering from an incipient ulcer, or a recovered patient, who was being considered. But how much attention did we pay to the feeding of schoolchildren until the inquest on the South African War drew attention to the poor physical condition of many of the recruits? And little interest was taken in the right feeding of the aged before the population curve made us realise that in twenty years' time the productive capacity of the old might be a matter of supreme importance. How far, then, was this conference prompted by the vague awareness that a policy of high employment makes it necessary to reduce the figures of absenteeism? Miss F. Garratt, in her paper on Some Existing Schemes and Plans, mentioned this aspect of the problem in her reference to Soviet experience. In 1935, according to the report of Burnet and Aykroyd to the League of Nations, 600,000 workers in the U.S.S.R. were receiving special diets in their canteens. Most of the early Russian researches were undertaken by Professor Pevsner and his colleagues, whose work has not been fully appreciated in Britain. Pevsner was studying the subject in 1922, but it was not until 1925 that he obtained permission to open an experimental department associated with a factory; and only in 1931 was the Moscow clinic established for the study of the influence of diet on incipient tuberculosis, rheumatic conditions, gastric ulcer, and other ailments. The process of industrial reconstruction doubtless delayed the application of Pevsner's findings; but the evidence suggests that even in a country with a high level of employment there were health authorities who needed to be convinced that the scheme was practicable.

Dr. F. Avery Jones, who spoke on The Patient Returns to Industry, was mainly concerned with the recovered ulcer patient. For such a man regular meals, a light diet, and the avoidance of undue fatigue are indispensable, if his ulcer is not to recur. Such foods as fried dishes, twice-cooked meat, new bread, pastries, meat soups, curries, stews, coarse-fibred vegetables, and fruit with pips or seeds should be avoided; and this demands specially prepared dishes served at correct intervals. "The man," said Avery Jones, "is not an invalid, and will be capable of a very good day's work, provided the hours are regular and there is no constant bending and he has the right diet." In their brief review of existing facilities, Miss Garratt and Miss J. Bond said that a great number of firms who have not yet initiated schemes for special diets are anxious to do so and are seeking guidance. The number of workers benefiting from the present canteen services rose steadily in 1944–45, as employees gained confidence in a diet that would help them to keep fit. The "Invalid Kitchens" organisation in London now operates eight centres with a delivery service capable of providing diet meals to small factories where no canteen exists. These modest experiments may well be the seeds of an inclusive scheme that will in time help to save the country several hundred thousand hours of absenteeism in an average working week. But it is not, it seems, until a country is compelled to weigh the cash value of output per man by the shrinkage of its labour reserve that it begins to set a value on preventive services of this nature. The benefit to the sufferers themselves could scarcely be reckoned in money alone.

RELEASE OF DOCTORS FROM SERVICES

GENERAL-DUTY medical officers in the Army are to be released as follows: groups 25–30 during January, groups 31–38 during February. Specialists in groups 25 and 26 will be released during January and those in group 27 during February. Because of their greater age on entry, the majority of specialists are in the first 30 groups, and proportionately the release of general-duty medical officers in groups 1–38 is equivalent to release of specialists in groups 1–27. The Central Medical War Committee is still recruiting specialists for the Army so as to facilitate release of specialists in later groups.

The Royal Air Force is stated to be releasing doctors in groups 27 and 28 in February and March.

Dr. H. E. MAGEE is to deliver the Milroy lectures at the Royal College of Physicians of London on Tuesday and Thursday, Feb. 12 and 14, at 5 P.M. He is to speak on the Application of Nutrition to Public Health—Some Lessons of the War.

Air Vice-Marshal T. J. KELLY, C.B.E., M.C., has been appointed an honorary surgeon to the King in succession to Air Vice-Marshal F. C. Cowtan, who vacates the appointment on his retirement from the Royal Air Force.

The Middlesex County Council have appointed Dr. J. B. COOK honorary consulting physician to the West Middlesex County Hospital. Dr. Cook retired last month after 32 years as medical director (formerly medical superintendent) and a total of 38 years' service to the hospital.

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Special Articles

PREVENTION OF ACCIDENT AND LIMITATION OF INJURY*

ST.J. D. BUXTON
M.B. Lond., F.R.C.S.
SENIOR ORTHOPÆDIC SURGEON, KING'S COLLEGE HOSPITAL

THE community is demanding that the medical profession shall develop the science of social medicine. Crew (1944) has defined this as medical science in relation to groups of human beings and includes preventive and industrial medicine in its scope. He maintains that industrial medicine is "not merely or mainly concerned with the prevention and elimination of sickness but is concerned also and especially with the study of all social agencies which promote or impair the fullest realisation of biologically and socially valuable human capacities."

The work of orthopædic surgeons has hitherto largely been the teaching and practice of clinical investigation, diagnosis, and treatment of those who come under our care and the study of the pathology of their condition; in addition, many of us have advised on the accommodation of our patients in hospitals and clinics and on the staffing of these institutions. We have interested ourselves in team-work and coöperated in rehabilitation.

The present is a suitable time to consider whether it is not also our duty to develop a far closer coöperation with industrialists and doctors concerned with that branch of industrial medicine we call trauma. Surely our vast experience of this subject can help to prevent many accidents, limit the injury they produce, and thereby reduce the impairment of human capacity from this cause. James Mackintosh (1944) remarked that we do not tell the public enough about the appalling waste caused year by year from sickness or try to show how much can be avoided. The same is true of accidents. The waste of man-power from accidental injuries in each branch of industry and on the road is made public, but few realise to what the total amounts, and this does not include the loss of work due to accidents in the home and on the playing-fields.

PREVENTION OF ACCIDENTS IN INDUSTRY

The Factory Act of 1844 was probably the first comprehensive measure to protect the worker from accident, but the country had begun to appreciate the dangers of industry some years before that. The *Times* of June 7, 1815, reported a statement made by Sir Robert Peel in the House of Commons that it was gratifying to learn that the loss of life had not exceeded 1% per year of those employed in cotton mills, and that this loss fell short of the average loss sustained in every other class of manufacturing industry. Dr. E. R. A. Merewether, HM senior medical inspector of factories, in his annual report for 1943, noted that the rate of fatalities was then about 0·017% per annum, and the proportion of mechanical accidents had been gradually falling until they were only 16·7% of the total accidents. Yet the Minister of Labour and National Service in the last Government still estimated the financial cost and production losses of industrial accidents at £70,000,000 a year. Moreover, during the war the accident-rate went up for some groups (table I).

TABLE I—ALL REPORTABLE ACCIDENTS

Year	Adult males	Adult females	Male young persons	Female young persons
1938	134,752	14,626	22,922	7803
1939	146,417	17,029	22,364	7665
1940	173,228	23,766	26,492	8493
1941	191,343	42,857	27,757	9341
1942	203,865	71,244	29,028	10,493
1943	200,651	73,065	27,623	9805
Per cent. increase of 1943 over 1938	*49*	*400*	*21*	*26*

The causation of these accidents is shown in table II. It is known that 1 in 7 of all injuries is to the foot, and two-thirds of these are toe injuries. That most of these are preventable is illustrated by the fact that in one large industrial firm where the spring-steel-capped boot has been used by employees foot injury is rare. Finger injuries form a higher proportion still and in some factories may be 1 in every 3 accidents. These two examples show that what are crudely called "*minor* injuries" are the "*major*" anxiety to the employer of labour.

In 1943 in shipyards and on ships in docks there were 20,868 accidents, of which 133 were fatal. This is an 8·5% increase on the previous year. Prevention is difficult, owing to the liability to fall and the fact that several contractors may each be employing several gangs of tradesmen in one ship. In London the River Thames Dry Dock Proprietors and Ship Repairers Association are active in preventive propaganda.

TABLE II—PROPORTION OF REPORTABLE ACCIDENTS (FATAL AND NON-FATAL) DUE TO VARIOUS CAUSES

Causation	1942	1943
	%	%
Power-driven machinery	17·1	16·7
Use of hand tools	8·0	8·2
Struck by falling body	12·0	12·0
Persons falling	13·3	12·8
Stepping on and striking against objects	8·2	8·7
Handling goods	25·7	26·1
All other causes	15·7	15·5

There is evidence that the first day at work is the most dangerous day, and that youths have a higher percentage of accidents than adults. The Factory Act provides a basic safety to the worker, but many factories go a stage further. There are fewer accidents if the indoor temperature is constant at 65° F, and if apathy and drowsiness are limited by suitable colouring of the walls or by special lighting.

The Royal Society for the Prevention of Accidents, which helps the Ministry of Labour and its Factory Department in this work, is fully aware of the human element in accident causation and is anxious to refute Mr. Micawber's remark, "Accidents may be expected with confidence and must be borne with philosophy." The worker must be taught to be safety-conscious and encouraged to be tidy, especially where gangways are concerned. "Good housekeeping" in a factory is all-important. The Society formulates six essentials of a works safety organisation: the support of the management, focusing the safety work in one man, safety committees, inspections and investigations, propaganda, and accident records.

The safety officer appears to be a link between management and employee, and when an industrial medical officer is employed he will be in constant touch with him as he is the head first-aid officer. He is not a tradesman, and it is estimated that one is required for every 1500 workmen. He can give invaluable advice to managers and education to the safety committee and employees. (In our experience preventive measures and general medical advice are usually of a lower standard in small factories than in the large ones.)

The Society lays great emphasis on propaganda, especially by leaflets, shop meetings, and posters, and produces these for issue by the Ministry.

Few hospitals file the case-notes in such a way that any comprehensive accident records can be ascertained. This applies particularly to the casualty department, and it must be realised that fracture-clinic records do not include all injuries.

THE MINES

In the mines there is great scope for limiting the accident-rate. The Safety in Mines Research Board emphasise the value of protective equipment, and most collieries carry on a continual campaign on lines advocated by the Royal Society for Prevention of Accidents. Nearly half the accidents in British mines causing

* Presidential address to the British Orthopædic Association, October, 1945.

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disablement for more than three days affect the hand or foot.

It is only during the last twenty years that any serious attempt has been made to introduce proper and suitable protective equipment for colliery work. Steel-capped boots, gloves, knee-pads, and shin-guards all give efficient protection, as do the hard hat and goggles to the head and eyes, but the wearing of protective equipment at coal mines is not enforceable by law, though certain colliery companies insist on their men wearing some of the equipment.

In a coal-mine I visited I saw no miner without the steel-capped boot, and most were wearing knee-pads of felt and leather; all the men I spoke to appreciated the protection to the toes afforded by the boot and realised the seriousness of beat knee. Few at the face wore hard hats, and they gave frivolous reasons for preferring a cloth cap. It struck me that hand protection was difficult, except away from the face, when gloves undoubtedly limit finger injury in manipulating tubs, pit props, and machinery.

When I visited Johannesburg in 1942, Fouché showed me the Mines Hospital and discussed the knee injuries of miners from the gold mines. In the Union the guards worn are of fabric-reinforced rubber, and resemble cricket pads. Similar guards for the elbow are available. Knee protection is particularly important for these miners, because penetrating wounds of the knee-joint are more frequent there than among our coalminers.

THE SERVICES

In his Harveian lecture this year Sir Alexander Hood urged that the keynote of all medical services should be prevention. The Army Medical Service was responsible for the crash helmet worn by motor-cycle riders, but protection from injury in mechanical transport is still in its infancy. Thus in one year in the Middle East there were over 8000 fractures from causes other than gunshot wounds. Experimental work on protection of the lower limbs of motor-cyclists has not yet advanced far enough to justify advice to manufacturers to build in a leg-protector. A sheet-metal guard fixed to the cycle will cause overheating of the engine in a warm country. The Canadian Army employed a tube-steel short guard, but this did not protect the knee or the femur. The ideal protective mechanism should be sufficient to prevent a fracture of the tibia or the femur and limit laceration of the soft tissue when a crash occurs.

It became evident in 1943 that injuries to the end of one or more fingers were being caused by the "lid" of certain types of tank dropping on the finger—so-called "tank finger." When the Army Medical Services had drawn attention to the frequency of this injury, it was prevented by a modification in design.

Sir Harold Whittingham (1944) has summarised the research done in the Royal Air Force medical branch to reduce accidents, particularly that into accident proneness, and many of us are familiar with the protective clothing worn and the continual efforts made to limit the effects of mishaps in that Service.

In the United States Lord and Coutts (1944) have surveyed the injuries encountered at a parachute school. At the time of the report there had been over 250,000 descents. They proved that when parachute-jumpers were taught to keep their feet together on reaching the ground, instead of following the old method of holding the feet 18 in. apart, the number of ankle fractures was much reduced.

ROAD ACCIDENTS

The 250,000 casualties a year on our roads include 6500 deaths and are costing the country £50,000,000 a year. Comparison of road and Merchant Navy casualties during the war show that the highways have been as dangerous as the high seas.

In general, fatal road accidents do not involve the very young; they are distributed fairly equally between the ages of 5 and 55, and people over that age suffer seriously. The efforts to prevent these accidents include the declaration made when obtaining a driving-licence, the Belisha beacon and road crossings and railings, road notices, speed controls, and the children's guides. Although the driver is required to read the Highway Code, there is no obligation on the cyclist or pedestrian to know of its existence.

In 1939 the Alness Report on the Prevention of Road Accidents attracted less attention than it merited, owing to the European situation. It is comprehensive and up to date today. In discussing the limitation of injury by improvements in car design the report pointed out that the human body is less likely to be severely injured if it strikes a flat surface than by an impact with prominent pieces of metal, such as a door-handle. The safety and welfare officer of one of our largest motor-car manufacturers thinks that motor-vehicle design has achieved a standard of safety thought unattainable twenty years ago. In his view the revolutionary changes are needed in the roads and not in the cars.

Most of us who treat people injured on the road will have noted groups of similar injuries, each caused in a similar way—such as the "bumper" fracture, and the "dash-board" simple fracture of the patella seen in passengers seated beside the driver. The motor-cyclist is prone to simple or open shin fractures, open wounds of the knee-joint with fracture of the patella, and fractures of the middle or lower third of the femur; further, two or all three may coincide in the same limb. The pillion rider may fracture her femur or dislocate her hip-joint.

The frequency of these injuries, which take months to repair, and our knowledge of their exact causation prompts me to urge that our opinion of how they can be minimised should command respect from manufacturers and those responsible for road-traffic control. The programme of imbuing older children with civic and communal responsibility—definitely a good safety campaign—will be more easily understood by them if they are shown why developments in road, car, and motor-cycle design have been made.

ACCIDENTS OF SPORT AND AT HOME

There does not seem to be any way of determining how many people are injured in their leisure hours, but Stocks (1945) has reported the civilian fatalities over several years. Nearly 500 males and nearly 800 females lost their lives in 1940 by falling downstairs. There must have been many more non-fatal accidents. If our stairs are at fault, prevention should be possible.

The prevention of accident and limitation of injury in all forms of sport provides the schoolmaster, coach, and physical-training instructor with enormous scope. How few are taught how to fall and how to save themselves when young, so that a useful safety habit is acquired.

FIRST-AID

Every year 20,000 factory injuries, causing three or more days' absence from work, become septic, so there is plenty of scope for first-aid in industry. Under the Factories Act, 1937, all factories must have first-aid boxes or cupboards or an ambulance-room; sometimes both are required. In 1916 important first-aid orders were issued by the Home Office under the Police, Factories, &c. (Miscellaneous Provisions) Act, and in 1930 the Board of Trade issued first-aid regulations applying to coal-mines. For many years the Order of St. John of Jerusalem, the British Red Cross Society, and the St. Andrew's Ambulance Association have instituted classes for training men and women not only in the British Isles but in many other parts of the world. Ministries, municipal authorities, and industrial business houses provide instruction, in some cases using the manuals of the Order of St. John or of the B.R.C.S. and in others pamphlets or books published for their own purpose. In 1939 the British Medical Association issued a pamphlet, *First-Aid in Industry*, which outlines the organisation suitable for a factory.

The teaching is done by medical men and by laymen who are already trained in first-aid. Certificates are given to those who pass the examinations. The doctors who give the lectures have had no teaching in this subject at their medical schools before this war. Hitherto the treatment advocated for a particular injury might differ in the various manuals, but it is now agreed by the Order of St. John and by the B.R.C.S. that the general principles in the two manuals shall agree. There is no doubt that a high standard of first-aid exists in this country. Before the war this was demonstrated in competitions, where teams and individuals showed great skill, and no-one will criticise the arduous task efficiently

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carried out during the war by those employed at first-aid posts. The objects of first-aid are:

1. To save life by removing the cause of injury or removing the patient from this, by stopping hæmorrhage, by enabling the patient to breathe, and by preventing shock.

2. To limit the damage due to the injury by first-aid treatment of wounds, fractures, &c.

3. To relieve pain.

4. To transport the patient to a suitable place for further treatment.

It must be appreciated that first-aid is as important for the everyday injury—those so-called minor injuries—as it is for the fractured leg.

In factories and mines there are a considerable number of men trained in first-aid, and where there is a safety officer he is likely to be responsible to the industrial medical officer and nurse, if either or both are employed. Small first-aid equipment is in workshops and at the coal face. In the factory there is an ambulance-room, which may be as complete as a doctor's surgery, even with a small X-ray plant. A similar room exists near the pit-head of some collieries, but more often it is comparable to a ward dressing-room with facilities for resting a patient, carrying out dressings, splinting, and keeping records. The value of a full-time industrial nurse at such a dressing-room is now appreciated.

There is good reason to believe that the community will benefit if students are taught the first-aid treatment of open wounds, especially of the extremities with or without fracture, during their instruction in the subsequent treatment of these lesions. The orthopædic surgeon should develop an entente with industrial medical officers, full-time or part-time, so that the first-aid treatment will never be a separate entity but the first stage of the treatment which we carry out in a hospital. An efficient coöperation will limit the time-lag between injury and primary surgical treatment and should limit the length of incapacity.

THE SURGEON'S TASK

During the last two decades the surgeon, especially the orthopædic surgeon, has had great experience in the treatment of injuries of the extremities. Through skilful treatment there has undoubtedly been limitation in injury, but advances in knowledge and improvement in the organisation of hospital accident services should limit disablement further. Hence it appears reasonable to investigate the opportunities for the surgeon to aid in the prevention of accidents and limitation of injury.

Policy of Surgical Treatment.—It is our aim and our duty to return the injured to his work in a fit condition as soon as possible and to limit disablement if such is inevitable. This does not necessarily mean that for every injury the most rapid method of treatment is the best, for in many cases it may not lead to the minimum of ultimate disability. The principle of choice is to plan each step in treatment so that the surgeon proceeds from one to the next with precision, until the work is completed. The patient is to be kept fit mentally and physically while his injury is being treated. It is bad policy to return a man to the workshop or his office in such a condition that symptoms recur shortly after his return to work.

The "open" wound has long been the origin of protracted suppuration, not only when complicated by fracture but also when limited to the soft tissues, including injury to tendons. The discovery of penicillin has enabled the surgeon to embark on excision and primary suture, and the alternative of a secondary or delayed suture, with much greater chances of success. Experience is already showing that, with the help of penicillin, the conversion of a compound into a simple fracture can be carried into effect with greater safety. The wider adoption of these procedures will immensely reduce not only the time taken for recovery after injury but also the resulting impairment of function. Nevertheless, penicillin is neither a preventive nor a cure for suppuration due to all organisms; so the problem is not yet totally solved.

Research has been revealing how often secondary infection reaches wounds during dressings, particularly those done before the patient reaches hospital. The reduction in the number of dressings at all stages of treatment of wounds, particularly those involving tendons, bones, and joints, is an important factor in limiting suppuration and shortening incapacity.

Accident Services.—In 1943 the fracture subcommittee of the British Orthopædic Association prepared a memorandum on accident services, supporting the formation of such services throughout the country. Organised fracture services were recommended by the B.M.A. committee in 1935, and by the interdepartmental committee of the Home Office, the Ministry of Health, and the Scottish Office four years later. A comprehensive accident service of the type foreshadowed by these committees was working well in Vienna fifteen years ago and is proving a success in Birmingham and Oxford; several also existed, under a different name, in the Middle East. Eastwood, centred at Tel-el-Kebir, proved its value to the troops in the Canal Zone, as did Brittain and Brewer in Palestine. In this country regional services will be required, and coöperation between voluntary and municipal hospitals is essential. An accident service will serve as an excellent training-ground for students, especially postgraduates, and for orthopædic and general surgeons.

Planned services are particularly needed for the accidents of industry and the road, not only for the fractures but also for the soft-tissue injuries; treatment should be carried out by and under the supervision of the head of the particular team according to the type of lesion. It is essential that there should be close contact with the industrial medical officer, the industrial nurse, and the safety officer. They should be welcome in the outpatient and inpatient departments, and we should coöperate with them. Continuity of treatment from first-aid to the completion of rehabilitation is most important in our work. The surgeon can also learn by visiting the factory and the coal-mine. The first-aid and the ambulance-room service and transport should all be familiar to the surgeon. Progress cannot be made by adverse criticism alone, but constructive suggestions are likely to follow a coöperative effort.

The blood-transfusion unit and a surgical team from the accident service should be ready to go at short notice to factory or colliery whenever treatment on the spot is likely to be more successful than transporting the injured to hospital.

Those concerned in the treatment of the accidents of industry must convince the industrialist not only that there is a planned service for his injured workmen but also that this service is staffed by doctors with an up-to-date knowledge of the conditions in industry.

The prevention of deformity is already recognised as part of the work of the orthopædic surgeon. Let us realise that the prevention of accident and limitation of injury is an equally important part.

I wish to thank Dr. S. W. Fisher and Dr. E. R. A. Merewether and their colleagues for providing facilities which enabled me to appreciate how prevention of accidents is carried out in industry.

REFERENCES

Crew, F. A. E. (1944) *Lancet*, ii, 617.
Hood, A. (1945) *Ibid*, i, 711.
Lord, C. D., Coutts, J. W. (1944) *J. Bone Jt Surg.* **26**, 547.
Mackintosh, J. M. (1944) *Lancet*, ii, 1.
Stocks, P. (1945) *Brit. med. J.* i, 601.
Whittingham, H. E. (1944) *Ibid*, ii, 539.

IN *Why Smash Atoms?* (Pelican Books, pp. 140, 9*d*.) Mr. Arthur K. Solomon, PH.D., poses a question which he does not answer. Instead, he gives us a good account of the vicissitudes of the atom since Rutherford first attacked it with alpha particles. It was almost inevitable that, having discovered that the alpha particle is ejected from the radioactive atom, Rutherford should use it to hit back at the atom. And now we see the consequences of a really inquiring mind! In a sense all went well till 1939, when the "scientific world was shocked by a new discovery": it was found that a neutron entering the nucleus of the uranium atom caused it to explode with the emission of a relatively enormous amount of energy. The result of this disinterested research is that while half the world now foresees relief from the economic burden of daily life, the other half believes that Nemesis is not far ahead. Dr. Solomon's reluctance to answer his own question is understandable.

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NEW YEAR HONOURS

THE first list of New Year's honours, issued this week, contains the names of the following members of the medical profession:

G.B.E. (Military)

Lieut.-General Sir ALEXANDER HOOD, K.C.B., C.B.E., M.D. Edin., F.R.C.P., K.H.P.
Director-general, Army Medical Services.

K.C.I.E.

Lieut.-General JAMES BENNETT HANCE, C.I.E., O.B.E., M.D. Camb.
Director-general, Indian Medical Service.

Major-General HEERAJI JEHANGIR MANOOKJI CURSETJEE, C.S.I., D.S.O., B.CHIR. Camb., K.H.S.
Late D.D.M.S., North-Western Army, India.

K.C.V.O.

Sir STEWART DUKE-ELDER, M.D., D.SC. St. And., F.R.C.S.
Surgeon-oculist to H.M. the King; late consulting ophthalmologist to the Army.

K.B.E. (Military)

Major-General FREDERIC THOMPSON BOWERBANK, O.B.E., M.C., E.D., M.D. Edin., F.R.C.P.E., F.R.A.C.P., K.H.P.
Director-general, N.Z. Army and Air Force Medical Services; physician to Wellington Hospital, New Zealand.

Surgeon Rear-Admiral GORDON GORDON-TAYLOR, C.B., O.B.E., M.S. Lond., F.R.C.S.
Consulting Surgeon to the Middlesex Hospital.

Surgeon Rear-Admiral RICHARD ALUN ROWLANDS, O.B.E., M.D. Lond., F.R.C.P.
Physician to the London Hospital.

Major-General WILLIAM HENEAGE OGILVIE, D.M., M.CH., F.R.C.S.
Surgeon to Guy's Hospital.

Major-General CHARLES MAX PAGE, C.B., D.S.O., M.S. Lond., F.R.C.S.
Surgeon to the Radcliffe Infirmary, Oxford.

Major-General ARNOLD WALMSLEY STOTT, F.R.C.P.
Physician to the Westminster Hospital.

Air Vice-Marshal STANFORD CADE, C.B., F.R.C.S., M.R.C.P.
Surgeon to the Westminster Hospital.

Air Vice-Marshal CHARLES PUTNAM SYMONDS, C.B., D.M., F.R.C.P.
Physician to Guy's Hospital.

Knights Bachelor

Major-General RALPH BIGNELL AINSWORTH, C.B., D.S.O., O.B.E., M.R.C.S.
Director of medical services, Joint War Organisation of British Red Cross and Order of St. John.

HAROLD ARTHUR THOMAS FAIRBANK, D.S.O., O.B.E., M.S., F.R.C.S.
Consultant adviser in orthopædic surgery, Emergency Medical Service; consulting orthopædic surgeon to King's College Hospital.

PAUL GORDON FILDES, O.B.E., M.B. Camb., F.R.S.
Director of chemical bacteriology, Medical Research Council.

ARCHIBALD MONTAGUE HENRY GRAY, C.B.E., M.D. F.R.C.P., F.R.C.S.
Dermatologist, University College Hospital; for special war services.

HENRY WADE, C.M.G., D.S.O., M.D. Edin., F.R.C.S.E.
Senior visiting surgeon, Bangour Emergency Hospital, West Lothian.

Lieut.-Colonel NILKANTH SHRIRAM JATAR, C.I.E., D.S.O., M.R.C.S.
Inspector-general of prisons, Central Provinces and Berar.

Lieut.-Colonel SAHIB SINGH SOKHEY, M.D., B.SC. Edin.
Director of Haffkine Institute, Bombay.

C.B. (Military)

Surgeon Rear-Admiral A. E. MALONE, M.B. Dubl.

Major-General D. C. MONRO, C.B.E., M.B. Edin., F.R.C.S.E., K.H.S.

Major-General T. O. THOMPSON, C.B.E., D.M. Oxfd, K.H.P.

Air Vice-Marshal A. F. ROOK, O.B.E., F.R.C.P., K.H.P.

C.B. (Civil)

Colonel L. W. HARRISON, D.S.O., M.B. Glasg., F.R.C.P.E.
Medical officer, Ministry of Health.

SOLLY ZUCKERMAN, B.A. Cape Town, D.SC. Lond., M.R.C.S., F.R.S.
Scientific director, R.A.F. bombing analysis unit; professor of anatomy designate, University of Birmingham.

C.M.G.

ROBERT BARR MACGREGOR, M.B. Edin., M.R.C.P.E.
Director of medical and sanitary services, Malaya.

C.I.E.

Colonel S. L. BHATIA, M.C., M.D. Camb., F.R.C.P.
Inspector-general of Civil Hospitals, Assam.

C.V.O.

IVAN WHITESIDE MAGILL, M.B. Belf.
Senior anæsthetist, Westminster Hospital.

C.B.E. (Military)

Surgeon Rear-Admiral C. F. O. SANKEY, O.B.E., M.B. Lond.

Surgeon Rear-Admiral F. J. D. TWIGG, M.B. N.U.I.

Surgeon Rear-Admiral R. J. WILLAN, M.V.O., O.B.E., M.S. Durh., F.R.C.S.

Brigadier J. D. S. CAMERON, M.D. Edin., F.R.C.P.E.

Brigadier J. M. MACFIE, O.B.E., M.C., M.B. Glasg.

Air Vice-Marshal F. C. COWTAN, C.B., M.R.C.S., K.H.S.

C.B.E. (Civil)

JOHN CRUICKSHANK, M.D. Glasg.
Professor of bacteriology, Aberdeen; for service to civil defence.

JOHN BOWMAN HUNTER, M.C., M.CHIR. Camb., F.R.C.S.
Sector hospital officer, London Emergency Medical Service.

CHARLES FREDERIC WILLIAM ILLINGWORTH, CH.M. Edin., F.R.C.S.E.
Honorary director of surgical services for the Emergency Medical Service, western area, Scotland; regius professor of surgery in the University of Glasgow.

THOMAS POMFRET KILNER, M.B. Lond. and Manc., F.R.C.S.
Nuffield professor of plastic surgery, University of Oxford; for services to the Ministry of Pensions.

Major-General R. W. D. LESLIE, C.B., O.B.E., L.R.C.P.I.
Regional hospital officer, Emergency Medical Service.

THOMAS PORTER MCMURRAY, M.CH. R.U.I., F.R.C.S.E.
Regional consultant in orthopædic surgery, Emergency Medical Service; professor of orthopædic surgery, Liverpool.

JOSEPH FRANCIS ENGLEDUE PRIDEAUX, O.B.E., M.R.C.S.
Deputy director-general, of medical services, Ministry of Pensions.

ARTHUR CHRISTOPHER TIBBITS, M.R.C.S.
M.O.H. for Nottinghamshire; for services to civil defence.

DAVID HYND, O.B.E., M.B. Glasg.
Territorial director, Swaziland branch, British Red Cross.

Lieut.-Colonel R. B. BILLIMORIA.
Hon. medical specialist, Indian Military Hospital, Bombay.

GEORGE VANCE ALLEN, M.D. Belf.
Principal, College of Medicine, Singapore; for services during internment.

DESMOND WILLIAM GEORGE FARIS, M.B. Lond.
Health officer, Malaya; for services during internment.

O.B.E. (Military)

Group-Captain F. R. CHISHOLM, M.D. N.Z., F.R.C.P., R.N.Z.A.F.

Colonel D. G. WALLACE, M.B., N.Z.M.C.

Surgeon Commander J. W. MACLEOD, M.D. McGill, R.C.N.V.R.

Surgeon Commander H. S. MORTON, M.B. Lond., F.R.C.S., R.C.N.V.R.

Surgeon Commander DAVID DUNCAN, M.D. Aberd., R.N.

Surgeon Lieut.-Commander F. P. ELLIS, M.B. Manc., R.N.

Surgeon Lieut.-Commander A. G. REWCASTLE, M.B. N.U.I., R.N.V.R.

Lieut.-Colonel S. P. BHATIA, I.A.M.C.

Colonel E. H. HALL, M.B. Dubl.

Lieut.-Colonel G. R. HARGREAVES, M.R.C.S.

Lieut.-Colonel W. H. HARGREAVES, M.R.C.P.

Brigadier B. E. SCHLESINGER, M.D. Camb., F.R.C.P.

Lieut.-Colonel P. A. STEWART, M.B. Glasg.

Colonel ALFRED SWINDALE, M.B. Durh.

Colonel A. C. TAYLOR, M.B. Toronto, F.R.C.S.E., I.A.M.C.

Lieut.-Colonel ALBERTINE L. WINNER, M.D. Lond., M.R.C.P.

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Wing-Commander G. B. GRAYLING, M.R.C.S., R.A.F.V.R.

Wing-Commander G. R. GUNN, M.B. Edin., R.A.F.V.R.

Wing-Commander K. B. REDMOND, M.B. Sydney, R.A.F.O.

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Colonel J. C. MACKENZIE, E.D., M.D. McGill, R.C.A.M.C.

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Lieut.-Colonel W. M. MUSGROVE, M.M., E.D., M.D. Manit., R.C.A.M.C.

O.B.E. (Civil)

DONALD MACDONALD WILSON, M.C., M.B. Edin.
For services to casualty-clearing hospital, Wellington, N.Z.

Mrs. FREDA GIBSON, M.B. Adelaide.
Flying doctor on Eyre Peninsula, South Australia.

FREDERICK HILTON WALLACE, M.B. Sydney.
For public and municipal services in Geelong, Victoria.

Lieut.-Colonel C. A. BOZMAN, M.B. Edin.
Officiating public-health commissioner Government of India.

Major JASWANT SINGH, M.B. Edin.
Deputy director, Malaria Institute of India.

HAROLD ERNEST RAWLENCE, M.D. Edin., F.R.C.S.E.
Residency Surgeon, Srinagar, Kashmir.

ERNEST JAMES BLACKABY, M.R.C.S.
Medical officer, Zanzibar.

Colonel J. P. FEHILY, M.B. N.U.I., F.A.C.S.
For services in connexion with reoccupation of Hong-Kong.

BRIAN MAURICE JOHNS, M.B. N.Z., F.R.C.S.E.
Surgeon, Malaya; for services during internment.

NICOL CAMPBELL MACLEOD, M.B. Glasg.
D.D.M.S. Hong-Kong; for services during internment.

RICHARD ALAN PALLISTER, M.D. Durh., M.R.C.P.
Medical officer, Malaya; for services during internment.

Mrs. MARGARET SMALLWOOD, M.B. Melb.
Medical officer, Malaya; for services during internment.

DEAN ABBOTT SMITH, M.B. Camb.
Medical officer, Hong-Kong; for services during internment.

M.B.E. (Military)

Surgeon Lieut.-Commander H. L. BACAL, M.D. McGill, R.C.N.V.R.

Surgeon Lieut.-Commander W. C. S. FIELDS, M.D. Harvard, R.C.N.V.R.

Surgeon Lieut.-Commander GAETAN JARRY, M.D., R.C.N.V.R.

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Surgeon Lieutenant J. I. CUNNINGHAM, M.B., R.N.V.R.
Surgeon Lieut.-Commander P. F. D'MELLOW, R.I.N.V.R.
Captain A. A. BASHIBY, I.A.M.C.
Major I. McK. BURNS, M.B. Glasg.
Captain FRANCIS EDWIN DIAS, I.A.M.C.
Captain R. E. GLEN, M.B. Glasg.
Major ALICE COX, M.D. Glasg., attd. S.A.M.C.
Lieut.-Colonel J. F. DAVIDSON, S.A.M.C.
Major EDWARD HORTON BENSLEY, M.D. Toronto, R.C.A.M.C.
Major HARRY HAMILTON CHACE, M.M., E.D., R.C.A.M.C.
Major FREDERICK CYRIL JENNINGS, M.D. Dalhousie, R.C.A.M.C.
Major C. J. MACDONALD, M.D. Dalhousie, R.C.A.M.C.
Major HUGH MACDONALD, E.D., R.C.A.M.C.
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Flight-Lieutenant DAVID CRICHTON, M.B. Edin., R.A.F.V.R.
Flight-Lieutenant R. W. MCDOWELL, M.B. Belf., R.A.F.V.R.
Flight-Lieutenant C. R. SLUMING, M.B. Lpool, R.A.F.V.R.

M.B.E. (Civil)

MRS. JEANIE G. FOUGERE, M.B.
For services to women's war organisations in New Zealand.
Captain A. R. P. IMAN, I.A.M.C.
Captain N. P. BILLIMORIA.
Hon. ophthalmic surgeon, Indian Military Hospital, Bombay.
HUBERT CRAYDEN EDMUNDS, M.R.C.S.
Medical Missionary, Hiranpur, Bihar.
PARESH CHANDRA GUHA, A.M.S., L.M.S.
Civil surgeon retd, Assam.
ANANT KRISHNAJI NULKAR.
C.M.P., Indian Military Hospital, Poona.
RAM LAL TULI, M.B. Punjab.
Deputy director of public health, Central Provinces and Berar.
JOHN AUSTEN PERCIVAL CAMERON, M.B. Edin., F.R.C.S.E.
Medical officer, Malaya; for services during internment.
NATHANIEL CRICHLOW, M.B. Glasg.
Medical officer, British Solomon Islands Protectorate.
NOEL JAMES LINNINGTON MARGETSON, M.D. Ontario, F.R.C.S.E.
M.O.H., Montserrat, Leeward Islands.
DOUGLAS ALKINS SKAN, M.R.C.S.
Pathologist, Nyasaland.
HUGH SMITH, M.D. Glasg.
For services during internment in Malaya.
WILLIAM DE WEVER WISHART, M.B. Edin.
Municipal health officer, British Guiana.
MUNIR KHALIL MISHALANY, M.D.
Asst. senior medical officer, Palestine (honorary).

Medicine and the Law

Child's Death in Hospital

REFERENCE was made in this column on Dec. 8 (p. 755) to a coroner's remarks at an inquiry into the death of a patient at the Manchester Children's Hospital. It was suggested that detrimental comments made at an inquest attain a publicity which can be less than fair to parties concerned. The report of Lord Wright's Committee on Coroners was recalled in support of the recommendation that a coroner should be chary of expressing views on professional negligence. The sequel seems to justify the warning.

The incident was, of course, the subject of full and prompt examination at the instance of the governors of the hospital. The report of the committee of inquiry will presumably not be made public. There is authority, however, for the following statement, which, in fairness to the resident surgical officer whom the coroner criticised, deserves no less attention than the criticism.

The coroner's comments gave the impression that the R.S.O. refused, on the ground that he was "off duty," to attend an urgent call, and that he callously allowed the child to bleed steadily to death. The committee of inquiry have found that he did not in fact make any such refusal on any such ground; that on the contrary he accepted responsibility without demur; that his delay in seeing the patient was due to his interpreting as a routine message what was intended to be an urgent call and was not due to any callousness or culpable neglect; and that, on realising the urgency, he acted promptly and efficiently.

The critics can, of course, rejoin that the truth and nothing but the truth emerged at the inquest, and that the hospital's inquiry naturally and inevitably resulted in white-washing the actions of the hospital staff. If, however, the committee of inquiry have not in fact conspired to put forth a deliberately false statement, we come back to the position that the coroner's criticisms received a publicity which no correction can catch up. Meanwhile all that can now be done is to make sure that there is as little ground for criticism as possible in future. The hospital can claim that, among some 26,000 patients treated for the removal of tonsils and adenoids during the past 25 years, there has been only one previous fatality of this nature.

The Patient on the Stairs

A paragraph in the *Times*, headed "£1641 Damages awarded against Doctor," proved to be less serious to professional reputation than the caption had suggested. The defendant, a radiologist practising in Glasgow, had been found at fault rather as a householder than as a medical practitioner. A patient who had come to consult him was told to find his own way out of the house. He was subsequently found lying helpless on the basement stairs; his spine was broken and he died two weeks later. Damages were awarded to the widow and her eight children. They had claimed £4700; they were awarded rather more than a third of that sum.

The cause of action was negligence. The Court of Session in Edinburgh held that the proximity of unlighted stairs to a dark or badly lit passage amounted to a danger to persons not acquainted with the house. The brief report does not state whether the judge took note of war-time difficulties of staff or of the fervent appeals of the Minister of Fuel and Power to turn off all lights. There was presumably no gas strike at the time. A medical practitioner in England, not many years ago, was sued when a visitor met with an accident through the slipping of a mat on a polished floor. Such mishaps are not peculiar to a doctor's household. A consultant could not contend that patients are not invited to his consulting-room.

The case is a reminder of the accidents that can happen to strangers on premises where the householder himself can move with assurance and safety in twilight or even darkness. Must the doctor be his own "usherette"? If he can get no domestic assistance, he sends his patients down the stairs at his own, as well as at their, peril.

The Sound Disposing Mind

A generation ago there was an effective challenge in the courts to the will of a testator who had taken the precaution of having it attested by no less than four medical practitioners. Perhaps that anxious circumspection was enough in itself to cast doubts upon his "sound disposing mind." Since that date Parliament has passed the Inheritance (Family Provisions) Act, 1938, which enables husbands, wives, unmarried daughters, infant sons, or other incapacitated children of the deceased to apply to the courts to alter the will where it is found not to have made "reasonable provision" for their maintenance. A few weeks ago the judges made the interesting decision that these applications under the 1938 Act must not raise the issue of the soundness of the testator's mind. Mr. Justice Vaisey, when hearing one such case, announced that he and his brother judges were agreed that in this context the question of the testator's unsoundness of mind, or even his want of lucidity of mind, could not possibly be entertained. As reported recently by the *Solicitors' Journal*, the learned judge observed that unsoundness of mind might be the reason why the will was in a peculiar form; it might be the reason why the will was unintelligible; but that was not the issue in applications under the Act. The Act directs the court, among other things, to "have regard to the testator's reasons, so far as ascertainable, for making the depositions made by his will," or for not making other provisions for his dependants' maintenance. Unsoundness of mind, said the judge, is not a reason; it is a lack of reason.

Without speculating how far this ruling would surprise the legislators who sponsored the Act of 1938, we may note that the judges, while purporting to prescribe a rule of practice, occasionally manage to mould the substance of the law. However that may be, the suggestion of weakness of mind is henceforth to be excluded on applications to secure some better provision for the maintenance of dependent members of the family of the deceased, though the absence of a "sound disposing mind" can still be relied upon as a ground for upsetting the will altogether.

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In England Now

A Running Commentary by Peripatetic Correspondents

AT daybreak, after driving all night, the field ambulance convoy crossed the Chindwin at Kalewa. All day our vehicles struggled over the steep dusty Schwegyin sector. Many free-running vehicles, whose drivers had recovered sufficient strength to proceed, dovetailed themselves into our convoy so that it was soon difficult to carry out a running check. As the sun set we drew off the road in thick teak forest. My transport officer reported all present and correct except for the two cook's lorries which had failed twenty miles back. I decided to meet the emergency by ordering an issue of biscuits and half a tin of self-heating soup per man. For the information of those who are as ignorant as we were, the latter consists of a tin of soup into which is built a core of solid fuel. The instructions invite one to pierce the lid in two places before applying a match to the central wick. Within two minutes the soup is boiling merrily and can be poured through one of the pierced holes. One requires no advanced scientific acumen to realise that the holes are at least desirable for the escape of steam. Jake, the tall and impressive commander of "A" Company, took his tin into the ambulance car in which he had been sitting. Without reading the instructions he lit the wick. He was fortunately standing at the door when the tin exploded. The inside of the ambulance and the outside of Jake were covered with an even film of ox-tail soup.

We are sending this new method of interior decorating to Mr. Bevan and it is big-hearted Jake's suggestion that any proceeds will go to the P.R.I. He got a new battle-dress out of the Quartermaster and nature is slowly replacing the skin. Our unit Nathaniel Gubbins, who never misses an opportunity, sent me a note. "Please Sir, Margaret's father wants to know if self-sodaing whisky cannot be provided instead."

* * *

It's those drains again. Having been dogged by dirty smells throughout the length and breadth of Italy, it is discouraging to find them running wild in this land of progress. By now, surely, the Admiralty ought to have learnt about drains, but they still seize an old and tottering mansion, just able to cope with the Squire and his occasional guests, fill it to overflowing with "personnel," and conveniently forget about the drains until the atmosphere is strong enough to reach Whitehall.

After one or two half-hearted attempts at coming to an agreement, with the taking of specimens and the sampling of atmosphere, ending in a pious hope that the situation would somehow settle itself, a real show-down has been staged, the Squire being apparently quite willing to see us all drown in our own excrement but being seriously concerned over the health of his herd of cattle.

The Naval party was led by the Commander in jovial and nautical mood, backed by the Queen Bee of the local Wrens, blonde, beautiful, and very much on her dignity; the doctor, who had spent the previous night buffing up his public health, finding that the only volume on the subject entirely ignored the sailor ashore but went into the fascinating details of the mechanisms of various sea-going appliances; and an engineering representative. The Squire was supported by a dangerous-looking legal gentleman, by the agent, and by the local sanitary man.

The question of pollution was beyond all possible doubt. How the bacteriologist could have counted those thousands of colonies was a bit of a mystery, but even without his reports the malodoriferous atmosphere was penetrating into the comfortable office in which the parties met, and the Navy felt the scales were loaded against them. The Squire showed a particular interest in the fate of typhoid bacilli after they had been swallowed by the cow; did they appear in the milk? The doctor bluffed his way through that one by saying he thought it quite possible, though reference to a large tome on agriculture could find no opinion on the subject.

"And what about the grass; isn't that contaminated?" asked the Squire. "I remember when I was in China," replied the Commander, in true Brains Trust style, "the Chinese prized this material for their crops, so I don't see why your cows should not grow fat on the grass. Besides, if the Chinese become immune to these damn diseases, why can't your beasts?"

The Squire by now had sized up the opposition, and he directed the force of his attack at the doctor, who was trying to hide behind the engineer. "Are your pipes trapped?" he demanded. "Sewage gas is dangerous, I know, and you are running the risk of serious outbreaks of diphtheria, chickenpox, mumps, and measles." A lot of this was news to the doctor, but he had a vague picture of S-bends and air-locks, so he assured the Squire that all the pipes were of the latest design and that there was no particular affinity between sewage gas and the Klebs-Loeffler bacillus.

Meanwhile a battle was developing between the agent and the engineer about the site of the proposed sewage plant. The engineer was naturally intent on placing it in a position that would be most economical in material and labour, but unfortunately this was just below the magnificent terrace, pride of the family for generations. The agent was explaining that it was false economy, since the plant would have to be removed before anyone in their senses would live in the house.

At this point someone rashly remarked that a stream of concentrated sewage had overflowed from the Wrennery and poured down the village street a couple of days before. The engineer was quick to point out that there had been heavy rainfall at that time, while the Queen Bee registered the appropriate horror.

"I cannot see any excuse for that," said the Commander. "Please inspect your tanks in the morning, Mam, and report their state to me at 0900." "Ay, ay, Sir. But for me to have to inspect drains at 8 in the morning is the absolute bottom." "That's just about right," roared the Commander, amid the general guffaw. "And in future I shall send a sailor round with a lead line twice a week to take soundings." "Very good, Sir, but don't ask him what he finds on the bottom or he might tell you."*

The meeting broke up in disorder.

* * *

How widely is this column read, how far afield it travels! Some weeks ago I wrote bemoaning the deterioration of the strawberry, and my reward has been most unexpected and gratifying. All sorts of kind people took to writing letters. The editor of the *Countryman* played a hand, and the long and short of it is that I have now got some news to impart. A Very High Authority in the strawberry world says: "There are still a few of the old strains and varieties of strawberries maintained in large private gardens, but owing to virus diseases they dwindle every year. I know of no source which I could recommend you to apply to for such choice types as Dr. Hogg and Waterloo. As you know, the Minister of Agriculture is only sponsoring the coarse low-grade Huxley* as being the easiest to grow and maintain." There! The next step is for us all (I mean all of us who share a passion for real strawberries) to hunt systematically for growers of Dr. Hogg and Waterloo, and to report from time to time in these columns. (The Editor permitting? I'm sure he will.)

I can give you another instance of the way in which this column gets around. On another occasion (Jan. 27, 1940, to be precise) I had occasion to lament the national lack of policy regarding tuberculosis during the early days of the war. Concerning the inevitable increase in its incidence I wrote: "It is true that quite advanced cases of pulmonary tuberculosis are being passed into the Army so long as they present no stethoscopic signs, and that a number will perish in military hospitals; but against them, thousands of consumptives have been evacuated from their sanatoria to tenements hermetically sealed during the hours of blackout, where they are sowing the infection quietly and efficiently . . ." Strong words? Yes, but in their context, obviously satirical. But they didn't sound at all satirical, they sounded perfectly frightening (to me, at any rate) when quoted practically word for word at 11 PM the following night by Lord Haw-Haw.

* * *

A surgeon was called in by the family physician to see a woman who had an inoperable carcinoma of breast which had not responded to X-ray therapy. He could make no suggestion regarding treatment, and told the relatives that the prognosis was hopeless. He then saw the patient again. She said, "Doctor, I know what is going to happen to me, I am going to die." The surgeon replied: "Yes, probably, but I am not going to condemn you. Miracles still occur though today we call them errors of diagnosis."

* Neither of the ones you know.

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Letters to the Editor

BIOLOGICAL DANGERS FROM ATOMIC FISSION

SIR,—The official account of the development of atomic energy [1] emphasises that "the questions involved are not technical questions; they are political and social questions" (p. 136). But the employment of nuclear fission on a large scale also involves biological problems which cannot be solved by any form of political or social control, even though atomic energy may be used for industrial purposes only. These problems have not been considered adequately and frankly in official statements, or in public discussions. I have been hoping for a lead from biologists or medical men more competent than I am to judge these matters; but since they have mostly remained silent, I venture to bring into the open some questions which first arose when an atomic bomb was dropped on Japan, but which have become more insistent since the official account has become available.

The account not only acknowledges, but emphasises, that nuclear fission produces intensive radioactivity in the pile and its surroundings (e.g., pp. 16, 38, 70–72, & 91). The radioactive fission products differ greatly with respect to their half-lives; but some decay so slowly and are so active that the idea was developed (p. 38) to use them like a "particularly vicious form of poison gas." The fission products produced in *one day's run* of a 100,000 KW chain reacting pile might be sufficient to make a large area uninhabitable.[2] Defensive measures (the nature of which is not disclosed) against the possible use of radioactive poisons by the Germans were planned (p. 39).

The radioactive fission products are not retained in the pile; from the account it appears, for instance, that the operation of the pile results in the dispersal (into the atmosphere) of radioactive material through stacks, which draw the radioactive gases from the plant itself (p. 72). The account briefly refers to the need for satisfactory stack operation, lest surrounding territory should be endangered (pp. 72, 91). Similarly, the account discusses the problems arising from the radioactivity imparted upon the coolant (p. 68); a large plant may consume as much water for cooling as a fair-sized city, and this water must be returned to its source, or otherwise disposed of (p. 70). Lastly, the separation of plutonium, which emits alpha particles and is one of the most toxic substances yet produced (p. 72), involves the processing of large quantities of radioactive fission products.

In view of the dispersion of radioactive material by a constituent process (e.g., dispersion of stack gases) the question of biological effect arises. There is no need to review the effects of intensive radiation upon human subjects; for many of these effects are generally known, and they can be guarded against by shielding the piles, control of clothing, &c.—although the account recognises that insidious toxic effects may have established themselves before manifest signs appear (p. 90). But in addition to the more obvious dangers, other biological effects of indiscriminate scatter cannot, to my knowledge, be excluded at the present moment.

Firstly, radiation may affect spermatogenesis at exposure levels at which it does not completely inactivate the seminiferous epithelium. Secondly, radiation may affect the differentiated gametes, and while not necessarily preventing fertilisation may cause early fœtal death. Thirdly, radiation may produce genetic changes. The genetic changes have, of course, been studied mostly in insects; but while it would be unjustified to predict the production of a subhuman mutant by atomic energy, the dysgenic potentialities of scattered radiation could only be discounted on the basis of experiments and observations extending over long periods.

The account, while repeatedly emphasising the dangers to health, refers only briefly to biological problems (e.g., pp. 74, 75, 84) and to protection against health hazards (p. 89); it does not discuss the former, and does not precisely describe the latter. It seems, however, that the standards for protection were based upon actual individual health only, and did not take into account delayed or genetic effects.

This risky procedure was of course inevitable in a race against time. No such urgency exists any longer, and before any country commits itself to further industrial projects concerned with nuclear fission, a frank discussion *in public*, and not only in committees of experts briefed by their governments, should be encouraged. Our government should give permission to any person having knowledge of the biological effects of nuclear fission and related subjects, to disclose the nature of these effects; thus public opinion may be adequately informed and able to decide whether any group should be allowed to embark upon atomic ventures.

It seems not impossible that frank disclosure of available knowledge will throw doubt upon the admissibility of the industrial employment of nuclear fission for whatever purpose. For it will hardly be maintained that any country has the right to scatter radioactivity, in war or peace, for any purpose whatever, and thus to endanger the habitability of the planet or the nature of its inhabitants.

London, W.1. B. P. WIESNER.

1. Smyth, H. D. Atomic Energy. A general account of the development of methods of using atomic energy for military purposes under the auspices of the United States government. Reprinted by H.M. Stationery Office. 1945. Pp. 143. 2s. 6d.
2. In fact the release of such activity accompanied the explosion of the atomic bombs (p. 127); but it is claimed that "practically all" the radioactivity is carried upwards by hot air, and that even with low elevations of explosion only a "very small fraction" of the radioactive products released is deposited on the ground below the bomb. No data relating to the duration of uninhabitability are given by official sources. The half-life of plutonium is 50 years.

WHITHER MEDICINE?

SIR,—I hope Dr. J. Grieve's letter will be given the attention that it merits, both in our medical schools and in the profession as a whole. Sound practice depends directly on sound theory. Modern medicine has not taken any account of modern philosophy. The matters discussed for example in Broad's *Mind and its Place in Nature* are the basic problems of modern medicine. Recent discussions of the "psychosomatic theory" seem to reveal the poverty of the philosophical equipment of doctors both in this country and in the United States. An irrational empiricism which masquerades as "science" guides thought, when it does not mislead it.

I wonder whether the time is ripe for the formation of a section or group for the study of medical theory and philosophy? Most of us will need to learn the elements of philosophy; but there are a number of doctors who are already working (more or less in isolation) upon this fundamental medical discipline.

Worcester. HOWARD E. COLLIER.

PENICILLIN IN PNEUMONIA

SIR,—In their discussion on the comparative effect of sulphonamides and penicillin in pneumonia (Dec. 22, p. 805) Anderson and Ferguson express surprise at the failure of penicillin to accelerate resolution of the pneumonic consolidation. They suggest that ischæmia of the vessels may prevent the therapeutic substance reaching the consolidated alveoli satisfactorily, at the same time preventing adequate absorption of the exudate. There is, however, the alternative method of administering penicillin to pulmonary cases by means of an aerosol inhaler. So far this has been found most useful in reducing the quantity of sputum in chronic lung conditions such as bronchiectasis, particularly in the preoperative stages, but theoretically it seems possible that it might accelerate resolution of a pneumonic consolidation. The Collison Inhaler, as supplied by the Inhalation Drug & Apparatus Co. Ltd., works on the principle of oxygen bubbling through an aqueous solution of penicillin, producing a fine moist spray which is inhaled through a mask. This spray not only reduces the number of organisms in the sputum but also moistens the air-passages, so diminishing the tenacity of the sputum and making it easier to expectorate. It may be found that consolidated lung, particularly that seen in lobar pneumonia, is not sufficiently penetrated by the spray to have much effect, but this is less likely to be the case in bronchopneumonia, and it is in the latter condition that poor resolution leading to bronchiectasis is to be feared.

London, W.C.1. C. ELAINE FIELD.

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DARK-ADAPTATION AND PSYCHOLOGY

SIR,—Mr. E. W. Godding is a little unfair in quoting me (Dec. 29, p. 863) as saying that night-blindness "was thoroughly investigated from every aspect except the psychological—the only one that mattered."

The statement was not general, but was specific to an epidemic of hysterical night-blindness in the 1914–18 war, and with this omission corrected I must adhere to the statement Mr. Godding calls misleading. The condition was investigated by the best ophthalmological talent in France, Belgium, and Germany, its true nature being missed. I gave a survey of the investigation and its futile results (*Proc. R. Soc. Med.* 1933, 26, 655), and recommend Mr. Godding to read it. In this country ophthalmologists or physiologists, or both, repeated the mistake a quarter-century later. Being apparently ignorant of that psychological factor concerning which Mr. Godding so airily remarks that its importance is obvious, they unwittingly fostered another epidemic of the hysterical disorder and had to be put right by psychologists. In face of these episodes it is rash of Mr. Godding to speak of my preoccupation with the psychological aspect of the phenomenon "to the exclusion of all others." I once received, from competent teachers and as a part of the normal curriculum, a training in physiology—including the physiology of vision—and pathology. Was Mr. Godding as fortunate in regard to psychology and psychopathology? When and where did he learn of the "psychological factor" in dark-adaptation? Was it before or after the work of Wittkower and his colleagues in 1941? What can he tell us about it now?

It is an old experience of mine, when I point out that some disorder is a hysterical mimicry of physical disease, to be showered with lists of physical elements in the disease, as if I didn't know about them. So Mr. Godding's shower has nothing original for me. I generally answer with a parable; here it is:—

A nocturnal reveller clinging to a post looked up at the yellow globe surmounting it and exclaimed "That's a very tall policeman!" "Come away," said his companion, "that's a Belisha beacon." "Don't care what you say," replied the first one; "there *are* some very tall policemen." For the time being I am not interested in the very tall policemen to whom Mr. Godding draws my attention, however important they may be on other occasions.

London, w.1. MILLAIS CULPIN.

ASEPTIC NECROSIS AFTER PENICILLIN THERAPY

SIR,—The paper by Wing-Commander Nelson-Jones and Squadron-leader Williams, in your issue of Dec. 22, draws attention to the dangers of the intramuscular penicillin drip. Now that penicillin is becoming more generally available it is desirable that the pros and cons of the various methods of administration should be weighed up. For this reason I venture to give some figures as to the relative frequency of abscesses.

During the year 1944, 1051 cases were treated with penicillin at this hospital; of these, 267 were treated by intramuscular drip, either with the 'Eudrip' or with an apparatus devised and made locally. The remaining 784 were treated by intermittent intramuscular injections. The penicillin solution was prepared with strict aseptic precautions in a bacteriological cabinet kept specially for the purpose. The same brand of penicillin was used throughout. The site of injection was, in each case, on the outer side of the middle third of the thigh. The drips were arranged so as to deliver 120 c.cm. in 24 hours, and later this was reduced to 60 c.cm. The needle site was changed daily. In spite of these precautions 17 abscesses occurred, which for the most part were sterile at the onset but became contaminated with penicillin-resistant organisms. In those few cases which were examined, section of the abscess wall showed generalised fat-necrosis. Of the remaining 784 receiving intermittent intramuscular injections, only 1 developed an abscess. Nevertheless, others developed a diffuse and brawny œdema and erythema, particularly when the injections were placed close together. The penicillin solutions for these cases were prepared in 20 c.cm. screw-capped bottles containing 10,000 units per c.cm.

The points in favour of continuous intramuscular injection are, of course, legion. These may be summarised as follows:

(1) Strict aseptic method of penicillin therapy can be maintained continuously.
(2) Blood level of penicillin can be accurately gauged.
(3) The patient avoids being awakened and subjected to multiple injections of an unpleasant nature.

Against these are:

(1) The difficulty in providing man-power for servicing and maintaining sufficient apparatus for constant use.
(2) That rubber tubing may cause a serious fall in penicillin potency.
(3) The patient may complain of being "tied up."
(4) The danger of abscess formation at the site of inoculation.

In favour of the separate and intermittent injections of penicillin are:

(1) Freedom from abscesses.
(2) It is easier to continue therapy, and less man-power is required.

Against it are:

(1) The increased importance of immediate sterilisation, and strict aseptic precautions.
(2) The dislike of the patient for frequent and sometimes painful injections in spite of combined local anæsthesia.
(3) Blood penicillin levels are inclined to vary.

R.A.F. Hospital, Wroughton. E. M. DABMADY.

PROSTATECTOMY

SIR,—Mr. Hamilton Bailey has done me the honour of an early comment on my retropubic prostatectomy, and has asked certain pertinent questions (Dec. 15 last). I note that throughout his letter he elects to use the term *prevesical prostatectomy*, as employed by Jacobs and Casper, in preference to that which I coined, and which I feel is more accurate and more descriptive. All suprapubic prostatectomies, excluding the little used transperitoneal route, are via the prevesical space, but in this extravesical approach the major part of the operation is conducted in the retropubic space, caudad to the bladder, and so is scarcely prevesical.

He states that he is puzzled as to how my operation differs from that described by the American authors. A study of their report clearly shows that they set forth to preserve the urethral canal intact, in which incidentally they failed, and by their technique they were able to deal only partially with the middle lobe. They admitted that the operation they envisaged was only applicable to certain types of obstruction, and in fact published a single case-report eleven years ago. As far as I can ascertain they have made no subsequent publication. I have proved to my satisfaction that in cases of pure extravesical lateral lobe involvement it is possible to leave the urethra intact, but that its blood-supply is inadequate, and it later sloughs in part. Moreover, the inevitable initial hæmatoma collecting between the urethra and the sutured capsule has faulty drainage. Credit for priority in the actual approach, as I mentioned in my article, appears to belong to van Stockum, who, as far as I know, was the first to describe a suprapubic extravesical prostatectomy, albeit he packed the prostatic cavity, and drained the bladder by cystostomy. My operation secures as complete a prostatectomy as in the classical transvesical procedures, and avoids opening the bladder.

Mr. Bailey asks why I, hitherto an advocate of endoscopic resection for the fibrous type of obstruction, have employed an open operation in two such cases. The reasons were that I wished to demonstrate that my retropubic procedure was applicable to all types of case, and that I presented a *consecutive series*. I still believe that, granted the urethra is of sufficient calibre to accommodate the resectoscope available (and it frequently is not), and even more important, that the operator is competent to perform a satisfactory resection, the endoscopic approach is that of choice in those cases of fibrous obstruction. There are still such cases not fortunate enough to fall into the hands of a skilled resectionist. Mr. Bailey then inquires whether the retropubic operation can be carried out as expeditiously and safely as a Freyer enucleation when a preliminary cystostomy has been established. The answer is not as

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expeditiously, but sufficiently so, and, I believe, with a safer and incomparably easier postoperative course in most cases.

With reference to the last paragraph of Mr. Bailey's letter, he cannot but be aware that even a nicking of the periosteum of the pubis in bladder or prostatic surgery may lead to a chronic osteitis, and I shudder to think of the sequelæ of his suggested osteoplastic trap-door. Let me stress that the retropubic space is neither deep, dark, nor dangerous.

Mr. Irwin appears to labour under the disadvantage of not having read the "description of a similar operation" by the two Italians in the monograph he elects to mention. Theirs is a literal translation of the case-report of Jacobs and Casper, and indeed purports to be such, being in inverted commas. No comments are offered, and there is no indication that these authors have ever employed it. It appears under the title of "Other Methods of Prostatectomy," and follows the archaic combined perineo-suprapubic method of Nicolle.

Mr. Irwin's figures, too, are remarkable. Vital statistics show that in a sufficiently large series of men of 70 years (a fair average for prostatectomy cases), one in every hundred will die each month; so that considering a period of seven weeks (again a fair average for the two-stage operation he so ardently advocates), 1·75% may be expected to die irrespective of hospitalisation, to say nothing of a major operation. His mortality of "about 1·6% at present" is a great achievement, if secured over a large enough series to be statistically significant.

London, W.1. TERENCE MILLIN.

SIR,—A new method of removal of prostatic obstruction is apt to start a wave of enthusiasm which creates the hope that the new technique will displace all the procedures which have gone before. The inevitable ebb generally leaves behind plenty of evidence that the innovation has after all a much more restricted scope than was originally claimed. For example a state of chronic urinary infection which is not uncommonly encountered after transurethral resection is a reminder of the limitations of this procedure, which however most of us use in selected cases.

The fact is of course that every method of prostatectomy so far devised has its weaknesses; and this is the reason why we turn eagerly to any new technique that presents itself in the hope that the perfect operation has at last arrived. It is the combating of the two formidable enemies, hæmorrhage and sepsis, with which we are continually concerned; and while we must strive to the uttermost to prevent them from appearing in the first instance, we must also avail ourselves of the best means possible of dealing with them when they do arrive.

Hæmorrhage and sepsis each serve as a handmaiden of the other; where one is, the other may be expected to follow; and wherever a high standard of hæmostasis has not been obtained, the need for suprapubic bladder drainage may be said to exist. The suprapubic tube is a safety-valve which all prostatectomists have had occasion to be thankful for; for should pyelonephritis or secondary hæmorrhage develop during the convalescence, there is no better way of helping the patient, as a first step, than by improving the suprapubic drainage. The suprapubic tube is also a safeguard in combating infection which may occur as a result of testing for post-prostatectomy obstruction.

Preoperative urethral instrumentation is the cause of much infective mischief after the prostatectomy. A recent cystoscopy, an indwelling catheter, or even a single catheterisation may be responsible. Infection of the already pathological prostate is not only the usual complication of such an intervention but is the commonest antecedent of ascending pyelonephritis in the male.

Post-prostatectomy indwelling catheter drainage has an added danger; this is urethral stricture, and its occurrence has a direct relationship to the size of the catheter, and the length of time the procedure has been employed.

The lessons I have learnt from committing all these faults have caused me for some years now—whenever it is practicable—to carry out the first instrumentation of the patient on the operation table, as an immediate preliminary to prostatectomy; on this occasion cystoscopy is carried out and the residual urine is tested. Such a routine certainly removes the danger of setting up a prostatitis. The low incidence of postoperative complications when this procedure has been followed has made a pleasant contrast with events in my cases when instrumental investigations were carried out within several weeks of the prostatectomy. With intravenous urography at our disposal as an excretion test, there is certainly no need for urethral instrumentation for such a purpose.

The aforementioned experiences in both one-stage and two-stage cases prevent me from subscribing to the view that there are special infective dangers in a carefully conducted transvesical prostatectomy followed by suprapubic drainage.

Thus in cases of retropubic prostatectomy where this need arises, to prolong bladder drainage by way of the urethra, the prospect of urethral stricture would be a real one.

When slow decompression is necessary, with the choice of several excellent trocars used in conjunction with Malecot tubes, a watertight suprapubic decompression is a simple accomplishment, and obviates the special dangers of an indwelling catheter. In my hands this method has been the means of saving many bad cases with high blood-ureas; and I strongly recommend it to those who have not practised it.

In two-stage prostatectomy the immunity following the first stage, against alarming infective processes in the second, in the great majority of cases makes the second operation a smoothly-running affair, in what was originally a worrying case; but sound judgment is always needed in deciding how long to wait between the two stages.

There are of course a number of complicating conditions of prostatic obstruction which require the bladder to be opened, such as clot-retention, a vesical diverticulum, initial vesical sepsis of a high degree, and large bladder stones. But apart from these requirements, and in spite of whatever place retropubic prostatectomy will take in the future, one may say that such excellent results can be obtained by a well-conducted one-stage or two-stage transvesical prostatectomy that this method is unlikely to lose its status as a sound surgical procedure. If retropubic prostatectomy is going to be the answer to all our prostatectomy worries, it is assured of a warm welcome; but we must guard against the temptation of allowing the attraction of a quick convalescence to jeopardise the ultimate safety of the patient.

Mr. Irwin has referred to his excellent mortality-rate at St. Paul's Hospital (no death in 55 consecutive cases). I might add that the mortality for the last 100 suprapubic prostatectomy cases at this institution is 1. The proper emphasis to put on this result is to call attention not only to operation methods but to the inestimable value of a well-organised and thoroughly trained team who are responsible for the after-treatment. I personally cannot speak too highly of the faithful and competent little band who have contributed so much to the success we have had at St. Paul's Hospital.

London, W.1. H. P. WINSBURY-WHITE.

MICROFILM AND MEDICAL LITERATURE

OUR annotation last week (p. 856) said that during the war the Royal Society of Medicine has been "sending out microfilm reproductions of books and papers that could not otherwise have gone overseas." We understand that in fact they have never sent out books in this way, but only individual papers extracted from journals. In their new programme (outlined by Mr. G. R. Edwards in his letter last week) they do not propose to film journals until they have (1) ascertained that the journals required by the libraries are not obtainable in print, and (2) have secured permission from the publishers of the journals.

THE following organisations recognised by the Board of Registration of Medical Auxiliaries have amalgamated to form the Society of Chiropodists: British Association of Chiropodists, Chelsea Chiropodists' Association, Chiropody Practitioners (N.I.Ch.), Incorporated Society of Chiropodists, and Northern Chiropodists' Association. The new society will take over the functions of the Chiropody Group Council in relation to the Board of Registration of Medical Auxiliaries. It may be addressed at 21, Cavendish Square, London, W.1.

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Public Health

C.P.H. and D.P.H.

THE General Medical Council has amended its rules governing courses of study and examinations in sanitary science, &c., so as to introduce a certificate in public health of a lower standard than the diploma. The council points out that although only medical officers of health and supervisors of midwives are by law required to hold a D.P.H., yet other specialised posts in many branches of public-health work have in fact become restricted to holders of the diploma. This has meant that doctors have spent time and energies in acquiring their D.P.H. when they might better have been employed in gaining experience and perhaps qualifications in their own special work.

From now on a candidate for the D.P.H. will have to take (*a*) a preliminary course in preventive and social medicine, covering one academic term of ten weeks; (*b*) a preliminary examination, on the results of which a "certificate in public health" will be granted by the examining body; (*c*) a final course in preventive and social medicine, covering five months of whole-time or 550 hours of part-time study; and (*d*) a final examination at which the candidate must produce a day-book as evidence of work done during his final course, and a dissertation on an approved subject. Candidates for the certificate will take only the preliminary course and the preliminary examination. In general, the council recommend that candidates for the certificate or diploma should not be admitted to the preliminary course until two years after qualification, though they suggest that the period should be reduced to one year for doctors who may in future be required to do a year of house-appointments between passing their final qualifying examinations and being admitted to the Medical Register.

INFECTIOUS DISEASE IN ENGLAND AND WALES

WEEK ENDED DEC. 15

Notifications.—Infectious disease: smallpox, 0; scarlet fever, 1753; whooping-cough, 1195; diphtheria, 575; paratyphoid, 1; typhoid, 6; measles (excluding rubella), 619; pneumonia (primary or influenzal), 969; cerebro-spinal fever, 44; poliomyelitis, 10; polio-encephalitis, 2; encephalitis lethargica, 1; dysentery, 313; ophthalmia neonatorum, 68. No case of cholera or typhus was notified during the week.

The number of service and civilian sick in the Infectious Hospitals of the London County Council on Dec. 12 was 1142. During the previous week the following cases were admitted: scarlet fever, 64; diphtheria, 51; measles, 20; whooping-cough, 34.

Deaths.—In 126 great towns there were no deaths from enteric fever or measles, 2 (0) from scarlet fever, 3 (0) from whooping-cough, 10 (0) from diphtheria, 42 (5) from diarrhœa and enteritis under two years, and 69 (6) from influenza. Figures in parentheses are those for London.

There were 2 deaths from whooping-cough at Birmingham. Liverpool reported 7 deaths from influenza, no other great town more than 4.

The number of stillbirths notified during the week was 213 (corresponding to a rate of 31 per thousand total births), including 21 in London.

WEEK ENDED DEC. 22

Notifications.—Infectious disease: smallpox, 0; scarlet fever, 1718; whooping-cough, 1100; diphtheria, 569; paratyphoid, 4; typhoid, 5; measles (excluding rubella), 623; pneumonia (primary or influenzal), 1166; cerebro-spinal fever, 43; poliomyelitis, 23; polio-encephalitis, 1; encephalitis lethargica, 1; dysentery, 230; ophthalmia neonatorum, 46. No case of cholera or typhus was notified during the week.

The number of service and civilian sick in the Infectious Hospitals of the London County Council on Dec. 19 was 1092. During the previous week the following cases were admitted: scarlet fever, 58; diphtheria, 60; measles, 11; whooping-cough, 29.

Deaths.—In 126 great towns there were no deaths from enteric fever or measles, 1 (0) from scarlet fever, 12 (0) from whooping-cough, 12 (1) from diphtheria, 58 (4) from diarrhœa and enteritis under two years, and 76 (6) from influenza. Figures in parentheses are those for London.

There were 3 deaths from diphtheria at Newcastle-on-Tyne. Manchester had 7 fatal cases of diarrhœa and enteritis, and Birmingham 6. Liverpool reported 7 deaths from influenza, Bootle 6, no other great town more than 3.

The number of stillbirths notified during the week was 227 (corresponding to a rate of 33 per thousand total births), including 14 in London.

On Active Service

CASUALTY

Captain WILLIAM LEE DONALDSON, M.B. Aberd.

It is officially reported that Captain Donaldson was killed in action at Singapore on Feb. 15, 1942.

AWARDS

C.B.

Surgeon Rear-Admiral C. E. GREESON, M.D. Aberd., R.N.

O.B.E.

Lieut.-Colonel D. A. McM. CRAWFORD, M.B. Edin., R.A.M.C.
Lieut.-Colonel G. T. HANKEY, M.B.C.S., R.A.M.C.
Major W. R. HENDERSON, M.B. Edin., F.R.C.S., R.A.M.C.
Lieut.-Colonel J. C. MACKAY, M.C., M.B. Edin., R.A.M.C.
Lieut.-Colonel D. H. THOMPSON, M.B. Birm., R.A.M.C.
Lieut.-Colonel T. H. WILSON, M.B. Lond., F.R.C.S., R.A.M.C.

M.B.E.

Major S. W. BARBER, M.R.C.S., R.A.M.C.
Captain P. T. COOPER, M.B. Camb., M.R.C.P., R.A.M.C.
Major G. M. R. DUFFUS, M.B. Aberd., R.A.M.C.
Major ROBERT HARVEY, M.B. Glasg., R.A.M.C.
Major C. W. HORNCASTLE, M.B. Lond., R.A.M.C.
Captain W. O. James, M.B. Edin. R.A.M.C.
Major P. D. C. KINMONT, M.B. Lond., R.A.M.C.
Major L. W. LAUSTE, M.B. Lond., F.R.C.S., R.A.M.C.
Major J. G. LAWSON, M.B. Durh., R.A.M.C.
Captain E. W. MACMILLAN, M.B. Edin., R.A.M.C.
Captain W. M. NICHOLS, M.B. Glasg., R.A.M.C.
Major B. H. PRICE, M.B. Camb., R.A.M.C.
Captain I. F. ROSE, B.M. Oxfd, R.A.M.C.
Major J. B. SHERMAN, M.B. Melb., R.A.M.C.
Major W. S. SYKES, M.B. Camb., R.A.M.C.
Captain DERYCK TAVERNER, M.B. Leeds, R.A.M.C.
Major A. W. WOOLEY, M.B. Brist., R.A.M.C.

M.C.

Captain ARTHUR BARBER, M.D. Lond., R.A.M.C.
Captain KITAINDA CALAPPA GANAPATHY, I.A.M.C.
Captain J. A. L. COOPER, M.R.C.S., R.A.M.C.
Captain N. J. CRAIG, M.B. Aberd., R.A.M.C.
Captain W. A. DEWAR, M.B. Glasg., R.A.M.C.
Captain A. M. GWYNN, M.B. Aberd., R.A.M.C.
Captain J. F. PANTRIDGE, M.B. Belf., R.A.M.C.
Captain J. R. PEREIRA, I.A.M.C.
Captain KELLOR MADHUSUDAN RAO, I.A.M.C.
Captain RAYASAM RAMACHANDRA RAO, I.A.M.C.
Captain T. B. SMILEY, M.B. Belf., R.A.M.C.
Captain J. S. WALTERS, M.B. Glasg., R.A.M.C.

MENTIONED IN DESPATCHES: R.A.M.C.

Lieut-Colonel A. G. D. WHYTE, M.B.E.
Majors.—W. M. DAVIDSON, R. R. GORDON, M.C., B. B. HOSFORD, W. R. HUNTER, C. W. A. KIMBELL, J. PARKES, P. SMITH, A. McL. W. THOMSON
Captains.—J. H. ANNAN, M.B.E., R. E. BONHAM CARTER, A. M. BOYD, J. G. CAMERON, E. F. M. CARAHER, J. E. S. CARMICHAEL, G. D. CRIBB, A. CROOK, G. I. DAVIDSON, G. FORREST-HAY, W. K. FREWEN, J. H. GIBSON, S. S. B. GILDER, R. W. GUNDERSON, D. R. HOLDEN, W. S. HOLDEN, D. G. HOWATSON, W. I. S. HUDLESTON, C. W. ILIFFE, J. A. JAMES, G. S. A. KNOWLES, D. W. LACEY, F. B. LAKE, N. R. LANSDELL, R. P. LAWSON, M.C., W. LUMSDEN, I. R. I. MACDONALD, L. MACLEAN, A. MACNAB, A. MIKELLIDES, N. E. MONTEUUIS, A. F. MURRAY, G. F. R. PARKER, R. POLLOCK, D. H. RANDALL, R. ROBERTSON, R. L. SANDERSON, I. SCHRIRE, C. A. SIMMONS, L. F. SMITH, I. O. B. SPENCER, I. McD. G. STEWART, A. C. P. D. THOMSON, M.C., C. E. C. WELLS, R. M. WILTSHIRE
Lieutenant J. GOTTLIEB

MEMOIR

Captain G. P. NASH, who died from diphtheria at Brussels on Nov. 23, was born at Kingston in Canada in 1908 and graduated at Queen's University there in 1932. After postgraduate work in New York, Edinburgh, and Liverpool he settled in practice in Oxford shortly before the outbreak of war. In 1940 he joined the R.A.M.C. and served with the 11th Light Field Ambulance. Later as R.M.O. to the 142nd and 178th Field Artillery Regiments, he went through the whole Italian campaign, taking part in the landings in Sicily, Salerno, and Anzio. When he was taken ill he was on his way home for demobilisation. "George Nash," writes I. P. W. S., "had the informality of the Colonial and a happy boyishness of temperament which endeared him to his patients and colleagues in Oxford." He leaves his wife with two young sons.

Bacon

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Parliament

ON THE FLOOR OF THE HOUSE

MEDICUS M.P.

THE House of Commons adjourned for Christmas in an atmosphere full of proposals for the future. There have also been big changes from war-time procedure to that of every day. Some controls have come off. You can set up a shop now—except a shop selling food—without a licence. The Ministry of Information is to disappear, but some of its good features are to be taken over by departments. Much direction of labour is to go, and as far as women are concerned nurses and midwives are the only classes who remain subject to direction. Another interesting release is that the House of Commons need no longer keep its secrets about its secret sessions held during the war. Some of these secrets concerned days, place, and hours of sitting, and were elementary precautions against air attack. But others related to matters of high policy, and the language used was, on occasion, very blunt. Records of the proceedings of these sessions, and of decisions reached, were made and kept at the time. But there were no records of speeches. It is suggested that in fact removal of the ban may be of more help to gossip than to history. There may be lively exchanges if anyone cares to publish what he himself and others said on, say, policy towards other countries, and if his fellow M.P. readers do not agree. It is very difficult to recall a speech made some time ago, and Mr. Eden, for example, has confessed that he does not remember at all what he might have said.

A big event of the last week of sittings was the passing of the Bill to nationalise the Bank of England by the Commons and the Lords. The Act is now law, for it has received the Royal Assent. The Peers took it very calmly. A bigger event was the discussion in the Lords of the American loan proposals, linked with Bretton Woods and the International Trade Organisation. This debate was of a high order, and Lord Keynes, who was our chief negotiator at Washington, made a speech which swept away opposition, so that Lord Beaverbrook got only 9 to support his opposition motion against 90 in favour. Lord Cranborne advised Tory Peers and others supporting His Majesty's Opposition to abstain from voting, since to defeat the proposals—which Tory Peers were in strength enough to do—would create more hardship for the people of the country. Without the loan, he said, we should not be able to purchase materials and machinery essential to the revival of our export trade and only to be obtained from America. We should have increased unemployment and increased suffering. And then Lord Cranborne crossed swords with Lord Beaverbrook. "There are," he remarked, "many people in this country who cannot command even the resources of the noble Lord, and their lot might very well be lamentable." To which Beaverbrook replied, "Is not the House of Salisbury very rich?" And Lord Cranborne riposted: "The very fact that the noble Lord and I have more than other people should make us more careful about the advice we give."

It is the existence of the high spirit in Parliament—and it is found in both Houses, in all parties, and in men of all social conditions—that makes the peaceful transformation of Britain from one stage of development to another possible by argument and Parliamentary discussion alone. And that spirit will be needed. For the nationalisation of the coal mines—the Bill is published—and the nationalisation of a large section of our industrial life, is certain.

Parliament will meet again on Tuesday, Jan. 22, for a strenuous series of sittings extending into July and August. The National Health Service proposals will come up in February, and the backbone of this will be the unified hospital service. The announcement of the ending of the sale and purchase of public practices has already been made. The original white-paper shows clearly enough what the main lines of the service must be. Discussion, which will be searching, between the Minister and representatives of the medical profession will not find its chief difficulty in the general plan, but in the shortage of accommodation and especially in the shortage of medical practitioners. Medical opinion in the House believes that the main lines of the scheme when it is announced will command the support of the medical and allied professions and of the general public alike.

Obituary

ALFRED BEUTHIN DANBY

F.R.C.S.E., F.R.C.O.G.

Mr. Alfred Danby, who died suddenly and unexpectedly at his home in Kidderminster on Dec. 9 at the age of 57, was well known in Birmingham and throughout the Midlands as a consulting gynæcologist and obstetrician.

He qualified in 1913 from Guy's Hospital where he was in the rugby XV. Soon afterwards he joined the Royal Navy and saw active service in the Dardanelles and Eastern Mediterranean campaigns. After demobilisation in 1919 he took his F.R.C.S.E. and went to Birmingham as resident surgical officer at the General Hospital. In 1921 he was appointed hon. assistant gynæcological surgeon to the hospital, and lecturer in obstetrics and gynæcology in the University of Birmingham, and a few years later he joined the staff of the Birmingham Maternity Hospital and became visiting gynæcologist to the Birmingham Mental Hospitals. He was elected a fellow of the Royal College of Obstetricians and Gynæcologists in 1935. A keen member of the Midland Obstetrical Society, he held office as its president. With the late Sir Beckwith Whitehouse he took an active interest in the work of the Lucy Baldwin Maternity Hospital at Stourport.

Whitlock

"He had," writes an associate, "a warm enthusiasm for obstetrics and was a careful surgeon with a high professional conscience and an understanding and sympathy for his patients. He spared neither time nor effort on their behalf. His loyalty to his colleagues and his interest in the welfare of the university and the hospitals which he served were salient characteristics of a pleasing personality. He had many friends and few enemies. He was rarely dogmatic and never aggressive, but when he had made up his mind on a matter of principle he would work for the objective with a grit and determination that were the admiration of all. His disarming and almost ingenuous manner enabled him to overcome the opposition of many and he was never uncharitable or ungracious. Teaching was not one of his strong points, but he was popular with the students and easily obtained their loyalty and coöperation.

"'Peter' Danby was at his best as a host in his own house, where the visitor was always made most welcome. He loved the companionship of his colleagues; he studied their personal tastes and was most solicitous for their comfort. He appreciated the good things of the table and was an entertaining conversationalist.

"In 1940 he developed a serious illness which rendered him a complete invalid for over two years, and he was never able to resume full work again. This illness he bore with outstanding fortitude and patience: he suffered much, but was never heard to grumble or complain. Although this illness prevented him from returning to an active professional life he continued to take a keen interest in the work of the university and the United Hospital, and rarely missed a meeting of the faculty or the medical committee of the hospital."

Mr. Danby married in 1929 Miss Victoria Arkell, and she survives him with four children.

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DONALD DUFF

F.R.C.S.E., F.R.F.P.S.

Mr. Donald Duff, consulting surgeon to the Glasgow Royal Infirmary and professor of surgery at St. Mungo's College, died on Nov. 25 in his 73rd year. After school-days at Daniel Stewart's College, Edinburgh, and a short business career, he returned to his native Glasgow to take the Scottish triple qualification from St. Mungo's in 1901. He obtained the F.R.C.S.E. in 1904 and was elected F.R.F.P.S. a year later. At first attracted to gynæcology, he soon turned to surgery, and became assistant surgeon at the Glasgow Royal Infirmary. During the 1914–18 war he served as a surgical specialist in the R.A.M.C. and was for a time consulting surgeon in Malta. On his return he took up his work at the Royal Infirmary once more, and in 1923 he was appointed surgeon with charge of wards. Shortly before he retired in 1938 his health began to fail, but with characteristic determination he carried on. His interest in the work of the Royal Infirmary did not flag, and he was appointed to the board of managers, where his long practical experience proved of great value.

Duff was a good surgeon and in the theatre his technique was meticulous. An exacting chief, he was also most helpful to juniors. His special interests were bone surgery and abdominal work, on which he published several papers, though a busy practice left him little time. "Donald Duff devoted his whole life to surgery," writes W. T. D., "and he had little interest in matters outside his profession. Straightforward and sincere himself, he had no use for quackery or humbug. When presented with a problem, he carefully considered all the facts, and having made up his mind he acted boldly. His rather brusque manner was often misunderstood, but those who knew him well saw that it was a pose adopted to hide a kind nature and rather shy disposition. He occasionally found time for a game of golf, and in his usual way he got down to fundamentals, studying the various swings in terms of anatomy and physics. In all his actions and utterances he upheld the best traditions of medicine, and his help was given unsparingly to all who sought it."

THE death is reported on Dec. 22, 1945, of Mr. A. SEYMOUR HARDING, late secretary of the Royal Institute of Public Health and Hygiene. In 1912 Mr. Harding joined the Institute of Hygiene, becoming chief administrative officer in 1924. He continued as general secretary after the amalgamation in 1937 of the Institute of Hygiene with the Royal Institute of Public Health, until 1942 when he retired because of ill health. He was 64 years of age.

Medical Diary

Jan. 6 to 12

Tuesday

ROYAL SOCIETY OF MEDICINE, 1, Wimpole Street, London, W.1.
5.30 P.M. *Psychiatry*: Mr. Alec Rodger: Personnel Selection—By Whom?

Wednesday

ROYAL COLLEGE OF SURGEONS OF ENGLAND, Lincoln's Inn Fields, W.C.2.
5 P.M. Prof. Willem Noordenbos: Choice of Oblique and Transverse Incisions in Abdominal Surgery. (Moynihan lecture.)

ROYAL FACULTY OF PHYSICIANS AND SURGEONS, 242, St. Vincent Street, Glasgow.
4 P.M. Prof. R. A. McCance: Bread. (Finlayson lecture.)

ROYAL SOCIETY OF MEDICINE
4.30 P.M. *Physical Medicine.* Dr. F. H. Kemp: Detection and Evolution of Adolescent Deformities of the Spine.

MEDICAL SOCIETY OF THE L.C.C. SERVICE
4.30 P.M. (County Hall, London, S.E.1) Sir Allen Daley: presidential address.

Thursday

ROYAL COLLEGE OF SURGEONS OF ENGLAND
5 P.M. Mr. Ivor Lewis: Surgical Treatment of Carcinoma of the Œsophagus with special reference to a New Operation for Growths of the Middle Third. (Hunterian lecture.)

Saturday

EUROPEAN ASSOCIATION OF CLINICAL PATHOLOGISTS
10 A.M. (Glaxo Laboratories, Greenford, Middlesex): annual general meeting.

Notes and News

POSTGRADUATE TEACHING AT MIDDLESEX COUNTY HOSPITALS

THE British Postgraduate Medical School has been finding increasing difficulty in meeting the demands of graduates from the provinces, Scotland, Ireland, the Dominions, India, and the Colonies for systematic education in the fundamentals of medicine and surgery. Many of these graduates intend to take up consultant practice in their places of origin. The Middlesex County Council have been asked to help by arranging clinical classes in their hospitals, and the council's public health committee have decided that the class in medicine could well be held at Redhill County Hospital, and that in surgery at North Middlesex County Hospital.

The selection of students, collection of fees, &c., would be done by the British Postgraduate Medical School, where the students would spend one day each week on the more academic subjects. The course of instruction would run continuously, and could be joined at almost any time for a period of 3–6 months. Four days a week would be spent at the county hospitals. Each class would consist of about 10 students, and some 15–20% of the total would be men of colour. Students would be non-resident, though meals would be provided at the hospitals. Some augmentation of staff would be required at the county hospitals, but the University of London would presumably recognise some of their senior physicians and surgeons as approved teachers.

The scheme, if approved, will probably come into force in April, 1946. If it proves a success, it may well be extended to other hospitals in the council's health service.

ILLICIT TRAFFIC IN OPIUM AND DANGEROUS DRUGS

A REPORT has been issued from Geneva by the Advisory Committee of the League of Nations giving a summary of illicit transactions and seizures of narcotic drugs from July 1 to Dec. 31, 1941. Delay and default are attributed to the disturbance during the war years, but annual reports for the years 1942, 1943, and 1944 are now being prepared. Thus this important part of the work in the international control of commerce in drugs of addiction, though impeded, has not been allowed to lapse. It is noted that the variation in exchange-rates and currencies in the different countries rather invalidates statistical comparisons.

The report deals with illicit traffic and seizures in Hong Kong, Shanghai, India, Egypt, Palestine, Straits Settlements, Macao, Columbia, and the United States. The total figures for the year 1939, now completed by the secretariat, show that in that year 28,723 kg. of raw opium were seized, 851 kg. of "prepared opium," 201 kg. of morphine, 177 kg. of heroin, and 23,314 kg. of Indian hemp. In 1940 the largest seizures of raw opium were in India, Egypt, and Syria and the Lebanon, of morphine in Turkey, and of heroin in the United States. The quantity of heroin reported to have been seized in 1941 shows a reduction, chiefly derived from the International Settlement in Shanghai.

A SHORTER CATECHISM

WHAT is UNRRA and how was UNRRA created? We all ought to know, but in a world of initials many of us will be grateful to the information division of UNRRA for answering this and 49 other questions in their little book *Fifty Facts about* UNRRA. For good measure they have also given us some excellent photographs showing their organisation in action. The pamphlet is intended for general distribution and copies may be had gratis from 11, Portland Place, London, W.1.

A PLASTIC STETHOSCOPE

IN the 'Helvin' plastic stethoscope, manufactured by Hellermann Electric Ltd., Brewer Street, Oxford, the tubing and chest-piece are made of flexible plastic closely resembling rubber but said to be much more durable and less given to perishing. "What is more important," writes a physician, "is that it possesses far better acoustics than my own familiar implement, which had hitherto survived all challenges for twenty years. All sounds, besides being twice or thrice as loud (gauged by observing how many thicknesses of cloth were necessary to obliterate a watch-tick), were deeper in pitch and more resonant. This was confusing at first, but one soon got accustomed to it, and after a full day's trial at medical boards—in the usual noisy surroundings—there was no going back. One can heartily recommend this new instrument to medical students embarking upon stethoscopy, and to practitioners who are prepared to revise their standards of stethoscopic findings." The price is 27*s.* 6*d.*

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University of London

Dr. Aubrey Lewis's appointment to the chair of psychiatry at the Maudsley Hospital has now been confirmed by the senate. As announced in our issue of Dec. 22, the London County Council will promote him to be director of clinical psychiatry at the hospital.

Dr. Lewis, who is 45 years of age, graduated M.B. Adelaide in 1923, and after holding resident appointments there went in 1926 to America to study psychiatry at Boston and the Johns Hopkins Hospital with a Rockefeller fellowship, which was later renewed to allow him to continue his studies in London (at the National Hospital, Queen Square) and in Berlin and Heidelberg. In 1928 he returned to London to work at the Maudsley Hospital with a research grant. Later he joined the staff and in 1936 he became clinical director. From 1935 to 1945 he was also consultant in psychiatry at the British Postgraduate Medical School, and he has examined for the Universities of London and Durham and for the D.P.M. of the Conjoint Board. In 1938, at the instance of the Rockefeller Foundation, he made an extensive tour of the chief European centres of research in psychiatry. He was a member of the expert committee on the work of psychologists and psychiatrists in the Services, which sat during 1942–44; he has lately acted as civilian consultant to the Royal Air Force; and he is a member of the recently formed Army Psychiatry Advisory Committee. He is also a member of the brain injuries committee of the Medical Research Council, the scientific advisory committee of the Wartime Social Survey, and the selection committee for Nuffield medical fellowships, and he has submitted evidence on psychiatric training to the Goodenough Committee. In his published work he has dealt with melancholia, cretinism, the heredity and the social effects of mental disease, and neurosis during the economic depression, in the Army, and in civilians in war-time.

The title of professor of applied physiology has been conferred on Dr. G. P. Crowden in respect of his post as reader in industrial physiology at the London School of Hygiene and Tropical Medicine.

Dr. Crowden, who is 51, was educated at King's School, Peterborough, and began his medical studies at University College, London, in 1913. At the outbreak of war in 1914 he was commissioned in the K.O.Y.L.I. and served in France as intelligence officer to an infantry brigade, being mentioned in despatches. In 1916 he was seconded as captain, R.E., to the Gas Services. In 1921 he took his B.SC. Lond. in physiology with first-class honours and was awarded a university studentship. He obtained the Conjoint qualification in 1925 and in the following year became assistant in the department of physiology at University College, where three years later he was promoted to a lectureship, and served as sub-dean of the faculty of medical science. In 1929, on the opening of the London School of Hygiene and Tropical Medicine, he was appointed lecturer in applied physiology, and later reader in industrial physiology, in the University of London. From 1928 to 1934 he was secretary of the nutrition committee of the Medical Research Council. He took his M.R.C.P. and his D.SC. in 1937. From 1931 to 1935 he was chairman of the council of the British Association for Physical Training, and in 1932 he published a book of lectures on *Muscular Work, Fatigue and Recovery*. He has also produced papers on the cost of a physiologically adequate diet, insulation against heat and cold for human comfort, artificial respiration, and muscular work in gas-protective clothing, and he contributed a chapter on personal hygiene to the 1944 edition of Jameson and Parkinson's *Synopsis of Hygiene*. For twenty years he has served the Research Defence Society as hon. secretary and editor of its journal, *The Fight against Disease*. He commanded the medical unit of the university O.T.C., and was mobilised in September, 1939, for service in the R.A.M.C. as lieut.-colonel in charge of training at a depot in Scotland. Later he became second-in-command at the R.A.M.C. depot, Aldershot, whence he proceeded overseas to command a general hospital in West Africa with the rank of colonel. During the war he was awarded the T.D. and appointed O.B.E. He was released from the Army last September.

Five public lectures on Pharmacological Chemistry will be given by Mr. F. Bergel on Tuesdays, at 5.15 P.M., from Jan. 15, in the physiology theatre of University College, Gower Street, W.C.1.

University of Durham

Squadron-Leader R. C. Browne, whose appointment to the new Nuffield chair of industrial medicine was announced in our last issue, is 34 years of age.

He obtained a second class in the honour school of physiology at Oxford in 1934, and the following year was awarded the Theodore Williams scholarship in pathology. After clinical work at Bristol he graduated B.M. in 1937 and took his M.A. the same year. Having held a casualty officer's appointment, he became house-physician to the professor of medicine at the Bristol General Hospital and then returned to Oxford as house-physician to the Nuffield professorial unit. In 1940 he obtained the M.R.C.P. and was awarded a Medical Research Council grant, which he held while working in the Nuffield department of clinical medicine. During the war he has served with the R.A.F.V.R. on full-time research duties for the Flying Personnel Research Committee, and has been working on the general problem of the relationship of health, performance, and the mechanical environment.

At a congregation held on Dec. 21 the following degrees were conferred.

M.S.—R. J. Rutherford, W. K. Yeates.

M.B., B.S.—Isabel Aitchison, Lilian Alexander, Jean E. Arkle, James Arkless, R. J. Belas, Eileen E. Cameron, Rachel Cameron, E. S. Clarke, Barbara E. Corlett, G. R. Cottrell, J. D. K. Dawes, R. J. Dias, Joyce Dixon, R. H. Etherington, Victor Franks, G. D. Fullerton, G. S. Graham, Jean A. Grant, V. F. Harrison, Joyce C. Harvey, Rita Hedley, G. L. Hindson, P. J. Hogg, W. F. M. Hudson,* A. S. Hughes, Patricia M. Hutchinson, A. C. Jenkins, Charles Johnson, William Latimer, Elizabeth Lawson, Sydney Levy, Mary Meikle, F. R. G. Mellor, Martin Menczer, Jean H. Mitchell, J. S. Noble, James Oldfield, A. C. Parry, Jean M. Paterson, B. E. Roebuck, W. M. Ross, C. B. S. Schofield, H. L. Simon, Jean D. Smedley, E. R. Smith, F. J. Spencer, N. B. Sprague, Kathleen M. Stevens, Mary Storrier, S. M. Szpiro, C. P. Tanner, T. C. Taylor, D. S. Thomson, J. N. Walton, D. D. Webster, A. E. White, Joan Williams, Maurice Wood, William Wood, K. D. Woolas.

* In absentia.

University of Bristol

As announced in our last issue, Mr. R. Milnes Walker, surgeon to the Royal Hospital, Wolverhampton, has been appointed to the newly established chair of surgery.

Mr. Milnes Walker is 42 years of age. He took the Conjoint qualification from University College Hospital in 1926 and was awarded the gold medal when he graduated M.B. with distinction in surgery and gynæcology at the University of London in the same year. He was again awarded the gold medal when he took his M.S. the following year, and in 1928 he obtained the F.R.C.S. After holding house-appointments at U.C.H., and visiting clinics on the Continent and in America, he became assistant to the surgical unit there till in 1930 he was appointed to the staff of the Royal Hospital, Wolverhampton. He is also consulting surgeon to the Wolverhampton and Midland Counties Eye Infirmary, to the Staffordshire, Wolverhampton, and Dudley Committee for Tuberculosis, and to the Birmingham Tuberculosis Service, and consulting surgeon to Hallam Hospital, West Bromwich, and Guest Hospital, Dudley. During the war he acted as group adviser to the E.M.S. Midland Region No. 9. A member of the court of examiners of the Royal College of Surgeons, he is also secretary of the Provincial Surgical Club. His published work includes papers on the removal of the lung, mediastinal lipomas, peritoneoscopy, and intestinal diverticula.

University College Hospital

The appointment of Dr. E. E. Pochin to the directorship of the department of clinical research has already been announced.

Dr. Pochin obtained a first in both parts of the natural sciences tripos at Cambridge and held the Michael Foster studentship in 1931. From Cambridge he went to University College Hospital, where he qualified in 1935, taking the M.B. in the following year, the M.R.C.P. in 1937, and M.D. in 1945. After holding house appointments at U.C.H. he became assistant in the department of clinical research in 1936, and a member of the scientific staff of the Medical Research Council in 1941. From 1941 to 1945 he worked in, and later directed, the M.R.C. physiological laboratory, A.F.V. school gunnery wing, at Lulworth Camp. A member of the Medical Research Society and the Physiological Society, his published work includes papers on exophthalmos and lid-retraction in Graves's disease, on pain perception and its delay in tabes dorsalis, on the effect of ischæmia, and on blood-volume determination. He is 36 years of age.

University of Liverpool

At recent examinations the following were successful:

M.D.—J. R. Hughes, C. McGibbon, H. Reid.

FINAL EXAMINATION FOR M.B., CH.B.

R. G. Thomas, L. F. Tinkler, Esmé M. Wren (with second-class honours); Audrey M. Ashcroft, N. L. Bailey, K. Baker, S. Beacon, D. T. Binns, R. Brearley, P. M. Bretland, Cécile N. Broster, J. H. E. Carmichael, Helen A. Cawson, A. D. Charnley, M. H. Clark, N. Coulshed, S. Croft, Pauline M. Dean, M. M. I. el Haddad, R. Ellam, H. C. Graham, E. A. Harris, F. G. Ince, R. W. Kennon, Barbara M. Killick, T. S. Law, Jean Learoyd, A. C. Levinson, T. R. Littler, J. A. O'Garra, A. E. Pritchard, Rachel M. Rawcliffe, G. P. Reed, H. Roberts, W. G. Roberts, P. W. Robertson, Olive R. Rodgers, L. Rosenbloom, H. H. Slack, Helen M. Taylor, L. Temkin, J. Ward, Joyce Watson, N. P. Watson, W. F. Wille, Aline N. Wynroe.

University of Birmingham

FINAL EXAMINATION FOR M.B., CH.B.

At recent examinations the following were successful:

J. K. Baird, D. H. Barnbrook, K. D. Roberts (second-class honours); R. J. Bennett, D. L. Crombie, J. C. Foster, J. C. Haworth, Rachel M. Hickinbotham, Gerald Jacobs, R. F. Martin, W. I. Murdoch, T. A. W. Parkes, F. C. S. Pearson, H. M. Rodger, Dorothy M. Tidmas, P. T. Walker.

Radiotherapy in Middlesex

The Middlesex County Council announces an interim organisation for radiotherapy in the county area. During the war patients have been treated at the county council's unit at the North Middlesex Hospital; and at the Mount Vernon Hospital, which has been staffed from the Middlesex Hospital under the E.M.S. scheme. It has now been arranged for radiotherapists from the Middlesex Hospital, under the direction of Prof. B. W. Windeyer, to make regular visits to the county council institutions. Suitable cases will be transferred to the Middlesex Hospital, from which they will be returned on completion of treatment. A permanent arrangement will depend on the expansion of the Middlesex Hospital's present radiotherapy department.

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Royal College of Surgeons of England

Sir WILLIAM COLLINS and Sir HENRY DALE, O.M., F.R.S., have been elected honorary fellows of the college. Sir William Collins has lately endowed professorships of anatomy and pathology at the college, and Sir Henry Dale has been associated with the college through his membership of the council of the Imperial Cancer Research Fund.

Royal College of Obstetricians and Gynæcologists

Regulations for admission of members have been modified by increasing the amount of special and general training required in the minimum period of three years that must elapse between the candidate's obtaining a registrable medical qualification and his application for admission to the membership. The modifications will apply to all candidates who sit for the membership examination for the first time in January, 1947, or thereafter. But candidates who have served as doctors in the Forces during the war may apply for permission to take the examination at any time under the regulations dated March, 1944. Details of the new regulations can be obtained from the secretary of the college, 58, Queen Anne Street, London, W.1.

When more facilities for training are available the college intends to increase the duration of the training for the membership examination to five years. Before the necessary regulations are introduced sufficient notice will be given to enable intending candidates to plan their course of training.

Prize for Work on X Rays

The Royal Society of Edinburgh will award in 1947 a David Anderson-Berry medal, together with a sum of money amounting to about £100, for the best recent work on the therapeutical effect of X rays on human diseases. Applications, which may be based on published and unpublished work, must be in the hands of the general secretary of the society, 22, George Street, Edinburgh, 2, by Dec. 1, 1946.

Lectures on Dairy Science

On Tuesday, Jan. 15, at 6 P.M., at the central laboratories of the Express Dairy Co., 133, Euston Road, London, N.W.1, Prof. H. D. Kay, D.SC., F.R.S., will give the inaugural lecture to a series of twelve lectures on Recent Advances in Dairy Science. Further information may be had from the principal of Chelsea Polytechnic, Manresa Road, S.W.3.

Tuberculosis Association

At a meeting to be held at 26, Portland Place, London, W.1, on Friday, Jan. 18, at 5 P.M., Dr. Norman Tattersall will deliver his presidential address on the Tuberculosis Service and the Future. Afterwards Dr. Jethro Gough will open a discussion on Pneumoconiosis of Coalminers, speaking on pathological changes in the disease, and at 8 P.M. Dr. Enid Rogers, the second opener, will speak on the incidence of tuberculosis in the disease. It is hoped to show a film on Methods of Dust Suppression in Coalmines.

Pharmaceutical Society of Great Britain

On Thursday, Jan. 10, at 7 P.M., at 17, Bloomsbury Square, London, W.C.1, the Harrison medal will be presented to Mr. R. R. Bennett, PH.C., who will afterwards give an address on the British Pharmacopœia.

Course on Mental Deficiency

The University of London extension and tutorial classes council, in coöperation with the Provisional Council for Mental Health, will hold a course on Educationally Subnormal Children and Mental Defectives, provided sufficient applications are received, at the London School of Hygiene, Keppel Street, W.C.1, from March 25 to April 5. Further information may be had from Miss Evelyn Fox, c/o the University Extension Department, 39, Queen Anne Street, W.1.

Research Board for the Correlation of Medical Science and Physical Education

The annual general meeting will be held at the Royal Institution, 21, Albemarle Street, London, W.1, on Wednesday, Jan. 16, at 2.30 P.M., when Dr. Frank Howitt, the chairman of the board, will preside. The speakers will include Sir Alfred Webb-Johnson, P.R.C.S., Mr. Aneurin Bevan, the Minister of Health, Air Vice-Marshal Sir Harold Whittingham, D.G.M.S., Air Ministry, Sir Reginald Watson-Jones, F.R.C.S., and Brigadier F. A. E. Crew, F.R.S. Last year at their general meeting the board produced the three-part report on Medical Science and Physical Education in their relation to Maternity and Child Welfare, Education, and the Services. This year the industry subcommittee, of which Brigadier Crew is chairman, will present the fourth part of the report on Medical Science and Physical Education in Industry. Tickets for the meeting may be had from Miss Bronwen Lloyd-Williams, 37f, Regents Park Road, London, N.W.1.

Royal Society of Arts

On Wednesday, Jan. 16, at 1.45 P.M., at the house of the society, John Adam Street, Adelphi, London, W.C.2, Sir Jack Drummond, D.SC., F.R.S., will speak on Famine Conditions and Malnutrition in Europe.

Return to Practice

The Central Medical War Committee announces that Dr. R. M. B. MACKENNA, F.R.C.P., has resumed civilian practice at 30, Rodney Street, Liverpool, 1.

Course for the D.P.M.

The usual course of lectures and practical instruction for a diploma in pyschological medicine will begin on Jan. 7 at the Maudsley Hospital, Denmark Hill, London, S.E.5. Further information may be had from Dr. W. W. Kay, Central Pathological Laboratory, at West Park Hospital, Epsom, Surrey.

THE Kodak film library, which was started by Messrs. Kodak Ltd. in 1930, has now been presented to the Royal Society of Medicine and will be operated by the society's film librarian.

Appointments

LYTLE, S. N., F.R.C.S.: temp. consulting surgeon, Borough General Hospital, Southampton.

RUSSELL STONEHAM, F. J., M.R.C.S., D.A.: senior anæsthetist, Birmingham Accident Hospital and Rehabilitation Centre.

WHAPHAM, EILEEN, M.D. Lond., F.R.C.S., F.R.C.O.G.: temp. hon. gynæcologist, Mildmay Mission Hospital, London.

Births, Marriages, and Deaths

BIRTHS

APPERLY.—On Dec. 18, in London, the wife of Surgeon Lieutenant P. R. Apperly, R.N.V.R.—a daughter.

BAKER.—On Sept. 18, at Cookham, Berks, the wife of Major W. H. J. Baker, M.B., R.A.M.C.—a son.

BARFORD.—On Dec. 17, at Redhill, the wife of Dr. L. J. Barford—a son.

BENNETT.—On Dec. 15, at Bideford, the wife of Surgeon Lieutenant D. H. Bennett, R.N.V.R.—a daughter.

CAMPS.—On Dec. 26, the wife of Dr. Francis Camps, of Harley Street, W.1.—a daughter.

CORBIN.—On Dec. 24, at Stourbridge, the wife of Dr. H. P. F. Corbin—a son.

CRAIG.—On Dec. 21, in London, the wife of Dr. J. W. Craig—a daughter.

FIELDING.—On Dec. 7, at Boston, Lincs, the wife of Dr. J. F. Fielding—a son.

LE CLERCQ.—On Dec. 25, at Harrow, the wife of Surgeon Lieutenant L. G. Le Clercq, R.N.V.R.—a son.

MARTYN.—On Dec. 18, the wife of Dr. M. King Martyn, of Cheltenham—a son.

MARTYN.—On Dec. 20, at Moreton-in-Marsh, the wife of Surgeon Lieut.-Commander D. Martyn, R.N.—a daughter.

MOREL.—On Dec. 19, in London, the wife of Mr. Mervyn Morel, F.R.C.S.—a son.

PELLY.—On Dec. 17, Dr. Salome Pelly (née Wordsworth), the wife of the Rev. R. L. Pelly, of Trowbridge, Wilts—a son.

ROBERTS.—On Dec. 21, at Inverness, to Dr. Maureen Roberts (née McWilliam), the wife of Surgeon Lieut.-Commander R. Howell Roberts, R.N.V.R.—a daughter.

RYCROFT.—On Dec. 25, at Exeter, the wife of Dr. R. N. Rycroft, M.C.—a son.

SPRINGETT.—On Dec. 29, in London, the wife of Dr. V. H. Springett—a son.

MARRIAGES

DAVIES—HUMM.—On Oct. 23, in London, John Victor Stewart Arlingham Davies, M.R.C.P., to Ailsa Joyce Humm (née Steven).

DUTTON—TWIST.—On Dec. 23, at Brentwood, Essex, Geoffrey Dutton, captain R.A.M.C., to Marjorie Twist.

INSLEY—HENDERSON.—On Dec. 21, at Edinburgh, John L. Insley, B.M., flying-officer R.A.F.V.R., to Morag L. Henderson.

RADFORD—IGGLESDEN.—On Dec. 22, at Bristol, Allan Philip Radford, lieutenant, R.A.M.C., to Rosemary Elizabeth Igglesden.

DEATHS

BALL.—On Dec. 21, 1945, at Carrickmines, co. Dublin, Sir Arthur Ball, Bt., M.D., M.CH. Dubl., F.R.C.S.I.

BECKETT.—On Dec. 23, at Shrewsbury, Hugh George William Beckett, M.R.C.S.

CLAPHAM.—On Dec. 20, Roderic Arthur Clapham, M.D., M.A. Camb., D.P.H.

CLARKE.—On Dec. 19, at Weobley, Hereford, John Stephenson Clarke, M.A., M.B. Camb.

DE MORGAN.—On Dec. 8, Harold Aylmer De Morgan, M.B. Lond., of Douglas, I.o.M.

EAST.—On Dec. 22, at Bagshot, Charles Harry East, M.D. Durh., formerly of Great Malvern, aged 84.

HOOPER.—On Dec. 23, at Weston-super-Mare, Arthur Winsmore Hooper, C.M.G., D.S.O., M.R.C.S., colonel R.A.M.C., retd., aged 76.

HOWARD.—On Dec. 27, at Upper Norwood, S.E.19, John Alexander Howard, M.D. Lond.

MACLEOD.—On Dec. 24, at London, Alastair Macleod, M.B. Edin.

MILLER.—On Dec. 13, at Nottingham, Conolly Stoupe Miller, M.B. Dubl.

RICHARD.—On Dec. 25, at Wollaton, Nottingham, George Herbert Richard, M.R.C.S., colonel late R.A.M.C.

SMITH.—On Dec. 20, at Ranelagh Avenue, S.W.6, John Percy Smith, M.R.C.S., L.D.S.

TURTON.—On Dec. 22, at Tunbridge Wells, Edward Turton, M.D., B.SC. Vict., HON. M.D. Leeds, M.R.C.P., formerly of Hull.

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SUBACUTE NECROSIS OF THE LIVER WITHOUT ICTERUS

J. STEWART LAWRENCE
M.D. Edin., M.R.C.P.
PHYSICIAN, HAYMEADS EMERGENCY HOSPITAL

SINCE Cayley (1883) first described subacute atrophy of the liver it has been variously recorded as subacute necrosis, subacute yellow atrophy, nodular hyperplasia, toxic cirrhosis, and subacute or chronic hepatitis. In the type most commonly encountered, repeated attacks of jaundice are associated with pain in the right hypochondrium, fatigue, anorexia, vomiting, and loss of weight. The liver is generally enlarged, firm, and tender, and the surface is smooth in the early stages, and later nodular; the spleen is often palpable. Fever is absent or slight. The urine, during a relapse, contains urobilin, bile-pigments, and bile-salts, and the stools at the beginning of an attack are clay-coloured. The blood shows a positive direct or indirect Van den Bergh reaction, and there is usually a moderate anæmia with a low white-cell count. As a rule liver-function tests are impaired, particularly during the stage of jaundice. Each attack may last several weeks or months, but between attacks fair health is maintained, though enlargement of the liver usually persists. Finally ascites appears, and hæmatemesis and melæna may develop, leading to a well-marked hypochromic anæmia. Œdema appears in some cases. The patient dies from either hæmorrhage or cholæmia.

The liver at autopsy may be enlarged or shrunken according to the degree of regeneration or necrosis, and the surface is smooth, granular, or hobnailed, depending on the duration of the malady. The cut surface is studded with yellowish nodules of various dimensions, some only 1–2 mm. in diameter, others so large as to produce gross deformity of the liver. The histological picture is of repeated destruction and regeneration of liver-cells, the yellowish nodules being masses of new cells not arranged in lobules, surrounded by compressed stroma, and separated by large areas in which the parenchymal cells have disappeared, leaving only the reticulin framework. If the destruction has been recent, the spaces in the framework are filled with dilated venous sinusoids; if of long standing, the framework is collapsed so that the stroma is dense. This stroma is infiltrated with inflammatory cells, mainly large endothelial cells and plasma cells with a few lymphocytes and polymorphs and an occasional eosinophil. The bile-ducts in these areas stand out, and, being crowded together by the collapse of the stroma, appear more numerous.

Jaundice is thus a prominent feature of subacute necrosis of the liver in the form most commonly encountered. Cases, however, have been reported, particularly in the more chronic form known as nodular hyperplasia, in which jaundice has been late or inconspicuous (Adler 1903, Yamasaki 1903, Schoppler 1906, McDonald and Milne 1909). Of Cullinan's (1936) twenty cases of subacute necrosis of the liver one, a boy aged 12 years, admitted with ascites, did not develop jaundice till the day before death, but nodules of regenerated liver-cells and surrounding fibrosis indicated that the disease was of long standing.

Rarely jaundice has been absent throughout, as in two patients recorded by Miller and Rutherford (1923) one of whom was admitted as a case of acute abdomen and died of hæmatemesis next day; the other had ascites and an enlarged spleen. Both had nodular hyperplasia of the liver. Eppinger (1937) found subacute atrophy of the liver in a woman who died after 5 days in coma but without jaundice.

PRESENT CASE

In January, 1942, an Army physical-training instructor, aged 25, was referred to the hospital outpatient clinic. He had been well till 2 months previously, when he began to ache all over, had shivering attacks, and felt generally run down. He attributed this to sleeping in wet blankets, but 2 weeks later he noticed he was pale and developed a cough. The pallor gradually increased till his first attendance at hospital.

The spleen was just palpable, but no other abnormal physical signs were found. The temperature was 98·8° F. A blood-count showed a moderate hypochromic anæmia: Hb 54%; colour-index 0·62; white cells 4400 per c.mm., with a normal differential count. On radiography the chest appeared normal. He was regarded as a case of simple iron-deficiency anæmia and was treated with ferri sulph. gr. 15 daily.

A month later, on re-examination he was found in addition to have œdema of the legs, scrotum, and penis. The liver was enlarged to 3 finger-breadths below the costal margin, and the spleen was still just palpable. The urine contained no albumin or casts. The anæmia had not responded to treatment with iron, the hæmoglobin still being 54% and the colour-index 0·78. There were 0·3% reticulocytes; the blood-urea was 31 mg. per 100 c.cm., the plasma protein 5·3%, and the erythrocyte sedimentation-rate (E.S.R.) 25 mm. in 1 hour (Westergren). A fractional test-meal showed free acid in amounts up to 50 c.cm. of *N*/10 acid per 100 c.cm.

During his first 3 weeks in hospital, his temperature showed an evening rise to 100°–101° F, but the blood-culture was repeatedly sterile, and agglutinins to typhoid, paratyphoid, and *Brucella abortus* were absent. Subsequently the temperature became normal, and under continued iron medication the anæmia steadily improved. By the 20th day the hæmoglobin had risen to 70%. On the 46th day all œdema had gone, the liver was no longer palpable, and the E.S.R. had been reduced to 18 mm. The hæmoglobin had remained at 70% but 2 weeks later was 74%, E.S.R. 12 mm. On the 88th day occasional spikes of temperature up to about 100° F began to appear at irregular intervals of several days.

On his 93rd day in hospital he complained of a feeling of weight in the right side of his abdomen, and the liver was again greatly enlarged, its surface firm and smooth. The urine contained no bile and the fæces, which were normally coloured, contained no abnormal elements on microscopical examination. The blood still showed hæmoglobin 74%; white cells 3400 per c.mm. (polymorphs 76%, lymphocytes 16%, monocytes 8%, myeloblasts 1%); platelets 280,000 per c.mm. The Wasserman test was negative and the coagulation-time normal. Two liver-function tests were performed; Quick's test showed an excretion of 1·76 g. of hippuric acid in 4 hours, and the prothrombin-index after administration of vitamin K was 80% of normal, both indicating some impairment of liver function. The Casoni test for hydatid disease was negative. A sternal puncture, performed by Dr. C. B. M. Warren, showed a slight increase of the maturer granulocytes but was otherwise normal. Radiography of the lungs again showed no abnormality.

Ten days later the abdomen had become distended, and there were shifting dullness in the flanks and a fluid thrill. Paracentesis produced a clear yellow fluid, which on microscopical examination contained a few lymphocytes. About this time his left arm became œdematous, and the axillary vein was thickened and tender. Treatment with mersalyl and ammonium chloride was begun but after 3 weeks had produced no improvement. The ascites was increasing, and the liver now reached the umbilicus. An exploratory laparotomy was thereupon performed by Mr. E. Gillespie.

At operation the liver was large, soft, and smooth, with a faint yellow mottling on its surface. The spleen was slightly enlarged and soft. No enlarged glands were found in the portal fissure or elsewhere, nor was there any apparent abnormality in the other abdominal organs. A small piece of liver was removed for section. Its cut surface revealed, on naked-eye inspection, minute yellowish nodules 1–2 mm. in diameter. Histologically there was extensive patchy degeneration and autolysis of the liver-cells, especially in the periphery of the lobules (figs. 1 and 2). In areas where the liver-cells had disappeared completely either their place was taken by dilated sinusoids containing red-blood cells or the reticulin framework had become collapsed and was infiltrated with inflammatory cells; the cells were mainly large endothelial, but there were many plasma cells, lymphocytes, and polymorphs, and an occasional eosinophil. The cellular infiltration was mainly near the portal tract but in some areas had spread to replace entire liver lobules, and islands of regenerating liver-cells could be seen in some of the damaged areas. Some lobules, on the other hand, were unaffected.

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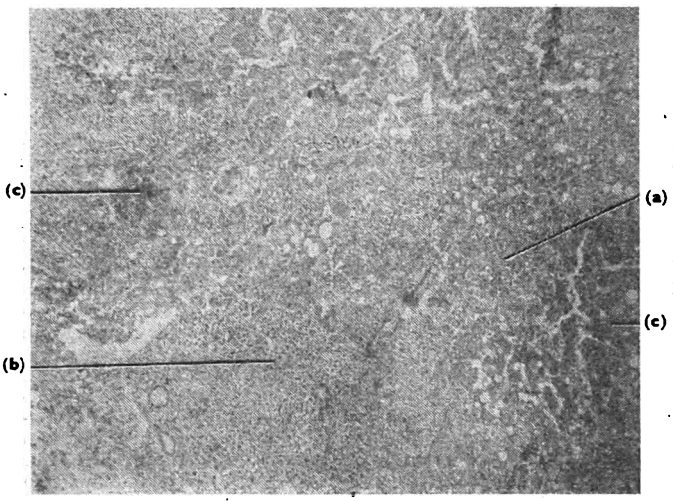

Fig. 1—Photomicrograph of biopsy specimen of liver, showing subacute zonal necrosis. Liver-cells have mostly disappeared, being replaced by dilated venous sinusoids (a) or, in the region of the portal tract, by inflammation cells (b). Islands of regenerating liver-cells (c) can be seen. (×45.)

After the operation ascitic fluid accumulated again rapidly and at one time burst out through the wound. Later a low-grade peritonitis set in, causing tympanites and finally loculation of the ascitic fluid, making it difficult to drain. Five weeks after the operation œdema of the scrotum and right leg had returned. The serum protein was now 4·2%, and a high-protein diet was therefore started (120 g. of protein daily). This did not affect the serum-protein level, and the œdema continued to increase, spreading to the other leg and both arms.

In the 11th week after operation the patient complained of numbness, first in the right foot and then in both hands and feet. Wasting of the shoulder and upper arm muscles was found on both sides (any possible wasting of the forearm or calf muscles was obscured by the œdema). There was slight weakness of the arms and hands and of flexion of the hips and dorsiflexion of the feet. The biceps-, triceps-, supinator-, and knee-jerks were present, but the ankle-jerks could not be elicited. Sensibility to cotton-wool was absent on the palmar surface of the hands and fingers, except the little fingers, and on the feet. Sensibility to pinprick and temperature and position sense were not impaired, but vibration was not felt over the elbows or wrists and was appreciated with difficulty over the knees and ankles. There was well-marked tenderness in the muscles of the thighs and calves.

As the clinical picture appeared to be that of a polyneuritis, the urinary vitamin-B_1 excretion was estimated by Prof. J. R. Marrack and found to be low (10 I.U. in 24 hours). The serum-protein level at this time was 4·6%, bilirubin 0·5 mg. per 100 c.cm., and prothrombin-index normal. Thiamine hydrochloride 5 mg. daily was then administered. The œdema rapidly subsided, and the numbness became less definite. In a few weeks the patient got up for an hour or two each day and walked about the ward; he continued to improve during the next 2 months. Then one day a dramatic change took place. In the morning he began to notice slight dyspnœa, he became drowsy towards afternoon, and by the evening he was completely unconscious. He died that night.

At *autopsy* the abdomen was distended but the rest of the body emaciated. There was much fluid in the pleural cavities. The lungs, pericardium, and heart showed no abnormality. The peritoneum was matted throughout by recent adhesions, and there was a small collection of pus just above the bladder. The liver was large and smooth and weighed 3270 g. (normal weight 1100–1650 g.). Irregular congested areas could be seen through the capsule. On section these well-defined red areas 1–3 in. in diameter comprised roughly half of the liver substance, the remainder having the normal appearance of liver tissue. There was no thrombosis or stenosis of the hepatic or portal veins and no enlargement of the lymph-glands in the portal fissure or elsewhere. There was no distension of the veins at the gastric cardia or the lower end of the œsophagus. The spleen was moderately enlarged and firm. No gross abnormality was found in the other abdominal viscera. The brain appeared normal.

Histologically the liver (fig. 3) showed changes similar to, but more advanced than, those in the biopsy specimen. The liver-cells had almost completely disappeared from the section, leaving the stroma infiltrated in a patchy manner with endothelial cells, plasma cells, fibroblasts, and polymorphs. This cellular reaction was found chiefly round the bile-ducts, which appeared more numerous than usual. In places a network of dilated sinusoids was found in the stroma. The few remaining lobules showed degeneration of the parenchymal cells, with disruption of the cell columns and infiltration with round cells. The Kupffer cells contained much hæmosiderin. A section of a mesenteric lymph-gland showed no abnormality.

FURTHER CASES PROBABLY BELONGING TO THIS GROUP

A number of cases described under different titles appear to belong to this group of subacute necrosis of the liver without jaundice. Thompson, McQuarrie, and Bell (1936) reported the case of a girl, aged 2 years, admitted for generalised œdema and ascites of 9 months' duration. She was found to have hypoproteinæmia (serum-albumin 1·9%, serum-globulin 1·4%). A high-protein diet was without effect on the serum-protein level, but a blood-transfusion caused temporary disappearance of the œdema and a rise in the serum-protein which took 7 weeks to fall again to its previous level. At autopsy the lever appeared normal, but microscopical examination showed a patchy atrophy of the liver-cells, especially in the periphery of the lobules. Bloomfield (1938) reported a man, aged 70, a teetotaller, who had an enlarged liver and spleen and leucopenia. Eight years later he developed a hypochromic anæmia, and in another 3 years had ascites, general weakness, and a hard liver. He died shortly after and was diagnosed as a progressive hepatitis with final cirrhosis. Wohlwill (1939) described under the title "diffuse interstitial infiltrative hepatitis" two cases of subacute hepatitis, one with protracted jaundice, the other without. The latter, a woman aged 30, was admitted with pyrexia and left upper abdominal pain. The liver and spleen were enlarged, and there was œdema of the ankles. There was a moderate hypochromic anæmia with leucopenia, and ascites and anasarca developed before her death in the 4th month of her illness. The liver on section showed a fine orange-tinged mottling, with intervening whitish strips. Microscopically there was extensive disruption of the liver-cell columns and destruction of liver-cells. Between the isolated groups of liver-cells there was diffuse infiltration with neutrophils, lymphocytes and large plasma cells, and the mesh fibres were augmented. Wohlwill considered this to be a further stage of the process found in serous hepatitis (catarrhal jaundice).

It is doubtful if the presence of well-marked cellular infiltration justifies the separation by Wohlwill of these two cases from the general group of subacute hepatitis or necrosis. Cellular infiltration, mainly with lymphocytes but also with endothelial cells, plasma cells, and polymorphs has been noted between the nodules of regenerating liver-cells in subacute necrosis by Muir (1908), Miller and Rutherford (1923), Hurley and Cameron (1926), Cullinan (1936), and Weldon (1939); in some the inflammatory cells were even aggregated to form nodules as in the case described in this paper.

CLINICAL FEATURES

Clinical features seen in 12 cases of subacute necrosis of the liver without icterus were as follows:

Symptom or sign	*Cases*	*Symptom or sign*	*Cases*
Ascites	8	Enlarged liver	3
Abdominal pain	5	Hypoproteinæmia	2
Œdema	4	Pyrexia	2
General weakness	4	Polyneuritis	1
Palpable spleen	4	Hæmatemesis	1
Anæmia	4	Diarrhœa	1
Leucopenia	3		

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Ascites.—Although ascites is so prominent in this condition, signs of portal obstruction are usually lacking, and it seems probable that a reduction of the serum-protein level plays an important part. The two cases in which the serum-protein level was estimated showed a definite reduction. This is likely to be due to inadequate formation of protein by the liver-cells, for hypoproteinæmia has been found in such liver diseases as carcinoma, cirrhosis, toxic and infective hepatitis, and obstructive jaundice (Salvesen 1929, Sawada 1931, Peters and Eisenman 1933, Snell 1935, Tumen and Bockus 1937, Conn et al. 1938, Wiener and Wiener 1942). The reduction was of the albumin fraction, the globulin often being increased. Myers and Taylor (1933) noted that the low serum-albumin level was uninfluenced by a high protein intake and was apparently not due to loss by removal of ascitic fluid, only 10 g. daily being lost in this way. Such a loss did not decrease the plasma proteins in experiments on dogs. Further, the hypoproteinæmia is apparently proportional to the degree of liver damage (Foley et al. 1937) and an essential factor in the development of the ascites, diuresis developing at a mean value of 3·1%. Portal obstruction undoubtedly plays a part in the production of the ascites in subacute necrosis of the liver, however, for ascites is found without anasarca in a third of the cases.

Œdema in subacute necrosis of the liver is probably entirely due to the hypoproteinæmia. Unfortunately the serum-protein level has been estimated in only two of the patients, but in both it was below the critical level of 5·5%. A notable feature was the lack of response to protein feeding, and this point may be of value in suggesting the true diagnosis when other evidence of liver disease is lacking and kidney disease has been excluded. Myers and Taylor (1933) reported persistent œdema in a man, aged 51, with a serum-protein of 3·4–4·0%. The usual causes of a low serum-protein level were absent, and a high-protein diet caused no improvement, but liver-function tests showed impairment of liver function. Prunty (1943) recorded the case of a man, aged 55, with anæmia of low colour-index, œdema, and hypoproteinæmia. There was no response to protein feeding. Hippuric-acid synthesis was 80% of normal. These two patients were considered to be forming insufficient albumin owing to liver disease and may possibly have been cases of subacute necrosis.

Polyneuritis was observed only in the present case. It develops in other diseases of the liver—e.g., biliary cirrhosis (Rolleston and McNee 1929) and portal cirrhosis (Wayburn and Guerard 1940). Patek and Post (1941) found polyneuritis in 40% of cases of cirrhosis of the liver. In the present instance it was associated with a deficient urinary excretion of vitamin B_1 and developed when the patient was on an ample mixed diet. It responded to large doses of the vitamin, and this was associated with a rapid subsidence of the œdema. The latter is difficult to explain, since no evidence of right heart-failure or enlargement was present to indicate the wet type of beriberi. It is, however, known that the conversion of vitamin B_1 into the pyrophosphate takes place in the liver before its utilisation by the tissues (Ochoa and Peters 1938); hence a conditioned deficiency of the resulting coenzyme might be expected in advanced liver disease.

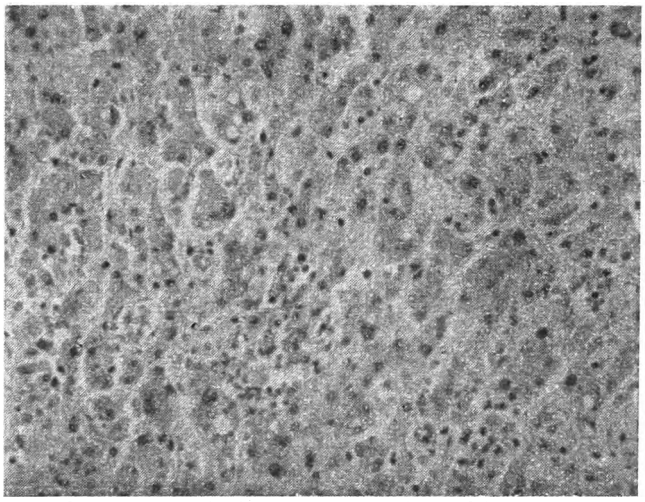

Fig. 3—Photomicrograph of post-mortem specimen of liver, showing one of the few remaining liver lobules. There is well-marked degeneration of the liver-cells and disruption of the cell columns. Note diffuse infiltration with round cells and polymorphs. (× 200.)

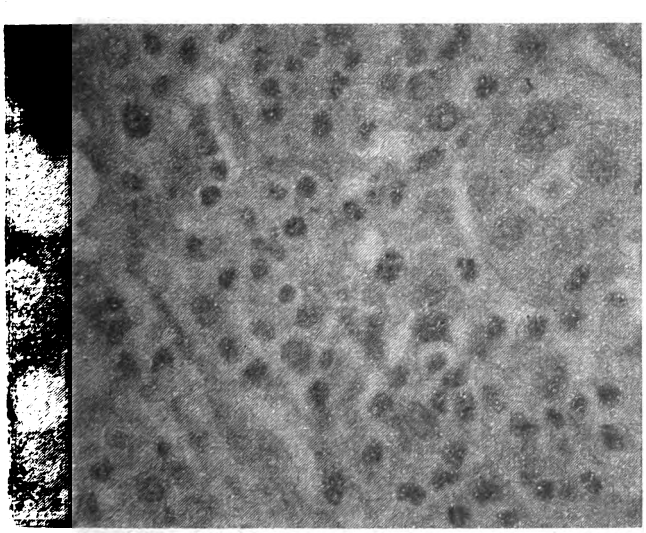

Fig. 2—Photomicrograph of biopsy specimen of liver, showing infiltration with large endothelial cells, plasma cells, lymphocytes, and polymorphs in the region of the portal tract. (×375.)

PATHOLOGY

The pathological changes met with in subacute necrosis of the liver without jaundice differ in no essential from changes found in the jaundiced cases. Wohlwill (1939), who described two cases, one with jaundice, found the two histological pictures identical. There is, however, a slight difference in the distribution of the liver-cell degeneration in some of the cases. In two it was predominantly at the periphery of the lobules in contrast to the more usual central lobular degeneration. The infiltration with inflammatory cells was usually fairly pronounced. As in acute hepatitis (Dible et al. 1943), it was diffuse during a severe attack or relapse—e.g., in autopsy specimens—and zonal in a biopsy specimen taken during the healing stage. The zonal type was periportal in distribution, as found in acute hepatitis.

ÆTIOLOGY

Subacute necrosis of the liver may be a sequel to infective hepatitis, but often no causal factor is evident. Cullinan (1936) has recorded 20 instances of the idiopathic variety and considers that in a mild form it may be fairly common and often remain undiagnosed. Rarely there is a history of exposure to one of the known liver poisons—e.g., arsphenamine, cincophen, benzene and its derivatives, carbon tetrachloride, and gold. Subacute necrosis has also been described after homologous serum jaundice due to inoculations of infected human serum (Ministry of Health 1943). In subacute necrosis without icterus a history of an initial attack of hepatitis with jaundice was, by definition, absent. This does not, however, exclude acute hepatitis as a possible causal factor. Blumer (1923) has noted that during epidemics of infective hepatitis a proportion of the patients do not develop jaundice, and Eppinger (1937) has recorded what he calls "catarrhal jaundice

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without jaundice." Svith (1939) has also described cases of "acute hepatitis without jaundice."

Histological evidence lends considerable support to this view of the causation of subacute neorosis without (or with) icterus, for the microscopical picture is very like that described in infective hepatitis by Iversen and Roholm (1939a and b), Cameron (1943), and Dible et al. (1943). The difference appears to be merely one of degree; for, whereas in simple infective hepatitis the reticulin network remains intact and the regenerating liver-cells retain their lobular arrangement, in the subacute form the reticulin network is compressed or destroyed and the regenerating liver-cells form nodules without lobular arrangement.

DIAGNOSIS

Subacute necrosis of the liver without jaundice must be differentiated from the liver cirrhoses, especially portal cirrhosis, in which an alcoholic history can usually be obtained and the typical facies and dilated umbilical and œsophageal veins are confirmatory; any nodules present on the surface of the liver in cirrhosis are small and even. In Banti's disease the splenomegaly is usually considerable and the liver enlargement a late finding. Syphilis of the liver, Hodgkin's disease, and primary or secondary malignant disease of the liver must also be considered. Where ascites and œdema with hypoproteinæmia are presenting features, nephritis, dietary deficiency, and gastro-enteritis must be excluded. Rarely protein loss in ulcerative colitis or exfoliative dermatitis may be of such a degree as to give rise to anasarca. A high serum-globulin level suggests liver disease, and a negative response to protein feeding is confirmatory. Where ascites alone is found, chronic proliferative peritonitis, constrictive pericarditis, and stenosis or thrombosis of the portal or hepatic veins (Chiari's disease) should be considered. Diagnostic laparotomy should be avoided, as it is often followed by a rapid deterioration, and aspiration biopsy is not without risk, though this appears to have been minimised by present-day technique with a fine cannula (Sherlock 1945). Liver-function tests give useful information.

TREATMENT

The treatment should be as for subacute necrosis with jaundice. The diet should be high in carbohydrate and during a relapse the patient should rest in bed and receive additional glucose and insulin. With this regime and a low protein intake Polack (1938) maintained in moderate health for several years eight patients with "chronic hepatitis" following an attack of infective hepatitis. The value of the low-protein diet, however, seems questionable in view of the findings of Himsworth and Glynn (1942) on the protective value of a high-protein diet on the liver. A hypochromic anæmia should be treated with iron and may respond well. For the œdema vitamin B_1 is worth a trial, particularly if polyneuritis is also present; transfusions of blood or plasma cause a temporary improvement and serve a dual purpose, for depletion of plasma protein renders the liver more susceptible to damage (Miller and Whipple 1942). Repeated paracentesis may be necessary for the ascites.

SUMMARY

A case of subacute necrosis of the liver is described in which jaundice was absent throughout; eleven further cases, in which it was absent or terminal, are reviewed.

The main clinical features are lassitude and dyspepsia of insidious onset, followed by ascites, œdema, and hypochromic anæmia. The liver and spleen may be enlarged.

The œdema is due to a reduction of the serum-albumin, resulting apparently from inadequate formation of these constituents in the liver.

I wish to thank Dr. H. C. Lucey for his pathological report on this case.

References at foot of next column.

EFFECT OF SOME ANTIBIOTICS ON PATHOGENIC FUNGI

A. G. SANDERS
M.B. Lond.
From the Sir William Dunn School of Pathology, Oxford

KNOWLEDGE of the powerful antibacterial action of some natural substances is growing rapidly. Most of those which have so far been isolated in a pure or relatively pure form are too toxic for use by parenteral or oral administration in generalised infection in animals or man. It is, however, possible that even some of the more toxic of these antibiotics may be harmless and effective when applied locally. In most instances more attention has been paid to their antibacterial than to their antifungal properties, and it seemed worth while to find out if some of them might be useful for the local treatment of the many fungal diseases of man if they were active in high dilution against the causal fungi. This paper describes the results obtained in a first survey of the antifungal properties of substances available in this laboratory. Unfortunately the work has been interrupted and in certain respects is not so complete as could have been wished, but the results are sufficiently clear-cut to make the observations of value and to point to the desirability of pursuing this type of investigation with all extracted antibiotics, no matter how toxic they appear to be.

Previous published work on the subject seems to be scanty, but a few species of fungi pathogenic to man were examined in vitro by Stokes et al. (1942) and Johnson et al. (1943), the former using tyrothricin, pyocyanine, and hemipyocyanine, and the latter gliotoxin. Pyocyanine had a weak action, and the three other substances inhibited pathogenic fungi at dilutions of the order of those used in the present work. The activity of streptothricin and streptomycin against a few species of pathogenic fungi was estimated by Robinson et al. (1944) in terms of units, and the figures are therefore not directly comparable with those for most other substances; streptothricin was more active than streptomycin. Herrick (1945) showed that clavacin (claviformin) partially inhibited the growth of *Monilia albicans* and *Oidium asteroides* at 1 in 2500 and 1 in 5000; *Trichophyton gypseum* was totally inhibited at 1 in 5000 and partially from 1 in 10,000 to 1 in 100,000, and 1 in 1,000,000 had no effect. In a test for killing, monilia and oïdium were killed within 1 hr by 1 in 100 and

DR. STEWART LAWRENCE: REFERENCES

Adler, L. (1903) *Z. Heilk.* **24**, 199.
Bloomfield, A. L. (1938) *Amer. J. med. Sci.* **195**, 429.
Blumer, G. (1923) *J. Amer. med. Ass.* **81**, 353.
Cayley, W. (1883) *Trans. path. Soc., Lond.* **34**, 127.
Cameron, J. D. S. (1943) *Quart. J. Med.* **12**, 139.
Conn, J. W., Newburgh, L. H., Johnston, M. W., Sheldon, J. M. (1938) *Arch. intern. Med.* **62**, 765.
Cullinan, E. R. (1936) *St Bart's Hosp. Rep.* **69**, 55.
Dible, J. H., McMichael, J., Sherlock, S. P. V. (1943) *Lancet*, ii, 402.
Eppinger, H. (1937) Die Leberkrankheiten, Berlin and Vienna.
Foley, E. F., Keeton, R. W., Kendrick, A. B., Darling, D. (1937) *Arch. intern. Med.* **60**, 64.
Himsworth, H. P., Glynn, L. E. (1942) *Clin. Sci.* **4**, 421.
Hurley, L. E., Cameron, G. R. (1926) *Quart. J. Med.* **20**, 449.
Iversen, P., Roholm, K. (1939a) *Acta med. scand.* **102**, 1; (1939b) *Acta path. microbiol. scand.* **16**, 427.
McDonald, S., Milne, L. S. (1909) *J. Path. Bact.* **13**, 161.
Miller, J., Rutherford, A. (1923) *Quart. J. Med.* **17**, 81.
Miller, L. L., Whipple, G. H. (1942) *J. exp. Med.* **76**, 421.
Ministry of Health (1943) see *Lancet*, i, 83.
Muir, R. (1908) *J. Path. Bact.* **12**, 287.
Myers, W. K., Taylor, F. H. L. (1933) *J. Amer. med. Ass.* **101**, 198.
Ochoa, S., Peters, R. A. (1938) *Biochem. J.* **32**, 1501.
Patek, A. J., jun., Post, J. (1941) *J. clin. Invest.* **20**, 481.
Peters, J. P., Eisenman, A. J. (1933) *Amer. J. med. Sci.* **186**, 808.
Polack, E. (1938) *Acta med. scand.* **93**, 614.
Prunty, F. T. G. (1943) *Proc. R. Soc. Med.* **36**, 180.
Rolleston, H., McNee, J. W. (1929) Diseases of Liver, Gall-bladder, and Bile-ducts, London.
Salvesen, H. A. (1929) *Acta med. scand.* **72**, 113.
Sawada, T. (1931) *Jap. J. Gastroent.* **3**, 38.
Schoppler, H. (1906) *Virchows Arch.* **185**, 402.
Sherlock, S. (1945) *Lancet*, ii, 397.
Snell, A. N. (1935) *Ann. Intern. Med.* **9**, 690.
Svith, N. (1939) *Ugeskr. laeg.* **101**, 287.
Thompson, W. H., McQuarrie, I., Boll, E. T. (1936) *J. Pediat.* **9**, 604.
Tumen, H., Bockus, H. L. (1937) *Amer. J. med. Sci.* **193**, 788.
Wayburn, E., Guerard, C. R. (1940) *Arch. intern. Med.* **66**, 161.
Weldon, S. G. (1939) *J. R. nav. med. Serv.* **25**, 279.
Wiener, R. E., Wiener, H. J. (1942) *Arch. intern. Med.* **69**, 67.
Wohlwill, F. (1939) *Schweiz. Z. allg. Path. Bakt.* **2**, 240.
Yamasaki, M. (1903) *Z. Heilk.* **24**, 248.

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within 3 hr by 1 in 200, and 1 in 1000 had no effect in 24 hr; for *Trichophyton* the corresponding longest times for killing by these dilutions were ¼, ¾, and 5 hr respectively. In comparing work of this type it should be remembered that the conditions of the particular experiment may greatly affect the titre.

Gilliver (1946) has shown that the substances found most active against fungi pathogenic to man in this work are also active against many fungi pathogenic to plants.

METHOD

Various rather elaborate methods have been used for testing the activity of fungicides and fungistatics on pathogenic moulds (for example, Sharlit and Muskatblit 1932, Smyth and Smyth 1932, Emmons 1933, Peck and Rosenfeld 1938, Burlingame and Reddish 1939, Keeney 1943). For the purpose of the present investigation, which was qualitative rather than quantitative, a simple method suitable for testing several antibiotics against some 40 species was needed, to decide which of them might repay fuller investigation. Though usually grown on solid media, these fungi will also grow readily in a liquid medium, such as glucose-peptone water. The use of a liquid medium to which measured amounts of the test substance can easily be added enables one to employ a simple routine bacteriological technique. Only a fungistatic effect (inhibition of growth) was looked for in this work.

Sterile glucose-peptone water, pH 6·5–7·0, was measured in 5 c.cm. amounts into dry sterile tubes. The test substance was dissolved in distilled water and sterilised by filtration through a Jena-glass filter, the strength of the solution always being such that 0·5 c.cm. added to a tube of broth would bring the final concentration to the desired figure.

The cultures were obtained from the National Collection of Type Cultures and were grown on glucose agar. Subcultures were usually 2–4 weeks old when used for inoculating the tubes containing the antibiotic. The tubes were inoculated with small pieces of mycelial felt, care being taken to cut the pieces as nearly as possible of the same size, to free them of adherent pieces of agar, and to take them from comparable areas of the culture, usually the growing edge. In all experiments control tubes were set up and inoculated from the same cultures. The tubes were incubated at 24° C and were inspected at intervals of 7–10 days for 6 weeks. Usually little additional information was gained after the first 2 or 3 weeks, except in the case of the naturally slow-growing species, such as *Grubyella schœnleinii*.

EFFECT OF ANTIBIOTICS ON THE GROWTH OF PATHOGENIC FUNGI IN A LIQUID MEDIUM

Fungus	N.C.T.C. no.	Tests at a single dilution								Dilution series with clavifórmin	
		Penicillic acid 1 : 5500	Penicillin 100 u/c.cm.	Helvolic acid 1 : 5500	Proactinomycin 1 : 5000	Chloroline 1 : 5000	Aspergillic acid 1 : 5000	Gliotoxin 1 : 140,000	Clavifórmin 1 : 11,000	Highest dilution giving inhibition (1 in . . .)	
										Complete	Partial
MICROSPORUM GROUP											
(1) Glabrous skin infection											
Sab. audouini	2526	P	+	+	+	0	P	P	0	80,000	160,000(c)
,, ,, ...	3005	..	+	+	+	0	0	P	0	160,000(c)	..
,, *felineus*	3006	P	+	+	+	0	0	+	0	160,000(c)	..
,, ,, ...	2524	..	+	+	+	0	0	+	0	..	..
,, *lanosus*	2525	+	+	+	+	0	0	P	+	..	..
(2) Hair infections											
Msp. fulvum	3007	P	+	+	+	0	0	P	0	80,000	..
,, *equinum* ..	3008	+	P	+	+	0	0	P	0	20,000	..
,, *ferrugineum* ..	3009	..	+	+	+	0	0	0	0	..	..
,, *japonicum* ..	2106	+	+	+	+	+	P	+	+	10,000	..
ENDOTHRIX GROUP											
Tricho. louisianicum ..	2786	..	..	..	+	0	0	..	+	..	..
,, *tonsurans* ..	2520A	+	+	+	+	0	0	+	+	..	..
,, ,, ..	2987	..	..	..	+	0	0	..	..	..	20,000
,, *effractum* ..	2992	..	..	..	+	0	0	..	..	40,000	160,000(c)
,, *fumatum* ..	2997	..	..	..	+	0	0	..	..	80,000	160,000(c)
,, *sabouraudii* ..	2521	..	+	+	P	0	0	+	0	40,000	..
,, ,, ..	2988	..	..	..	+	0	0	..	..	..	80,000
,, *sulphureum* ..	2522	..	..	..	+	0	0	..	..	20,000	160,000(c)
Bodinea violacea ..	2990	+	+	+	+	0	0	+	0	160,000(c)	..
Tricho. decalvans ..	2784	..	..	..	+	0	0	..	..	80,000	..
,, *cerebriforme* ..	3000	P	+	+	+	0	P	P	0	40,000	..
,, *plicatile* ..	2999	..	..	..	+	0	0	..	..	10,000	..
ECTOTHRIX GROUP											
Small spore : gypseum											
Tricho. asteroides ..	3002	+	+	+	+	0	0	P	0	..	..
,, *lacticolor* ..	3001	..	..	..	+	0	0	..	..	20,000	..
,, *granulosum* ..	3003	..	+	+	..	0	0	P	0	..	10,000
,, *persicolor* ..	2998	..	..	..	+	0	0	..	..	160,000(c)	..
Large spore—downy											
Tricho. equinum ..	2996	+	+	+	+	0	0	P	0	..	..
Large spore : faviform											
Tricho. album ..	2993	..	+	+	+	0	0	0(a)	0	20,000	..
,, *discoides* ..	2995	..	..	..	+	0	0	..	+	..	..
,, *balcaneum* ..	704A	..	..	..	+	0	0	..	..	160,000(c)	..
GROUP UNCERTAIN											
Tricho. depressum ..	3004	..	..	..	+	0	0	..	..	10,000	..
FAVUS GROUP											
Achorion gallinæ ..	3015	..	+	+	+	0	0	0	..	160,000(c)	..
,, *gypseum* ..	3013	+	+	+	+	0	0	+	..	10,000	..
,, *violaceum* ..	3012	..	+	+	+	0	0	+	..	80,000	160,000(c)
,, *quinckeanum*	3011	P	+	+	+	0	0	P	..	160,000(c)	..
Grubyella schœnleinii	3010	+	..	+	+	P	0	0(b)	0	160,000(c)	..
EPIDERMOPHYTA											
Epi. cruris	2780	P	+	+	+	0	0	0(b)	0	160,000(c)	..
,, *perneti*	3016	+	+	+	+	0	0	P	0	40,000	..
,, *rubrum*	702	+	+	+	+	0	0	+	0	80,000	..
ENDODERMOPHYTA											
Endo. indicum ..	703	P	+	+	+	0	0	+	0	160,000(c)	..
,, *tropicale* ..	1758	P	+	+	+	0	0	P	P	160,000(c)	..
"THRUSH"											
Endomycopsis albicans	714	+	+	+	+	P	0	+	+	..	..

+ = growth as controls. P = partial growth substantially less than controls. 0 = no growth. . . . = not tested.
(a) completely inhibited up to 1 : 200,000. (b) completely inhibited up to 1 : 400,000. (c) highest dilution tested.

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In the first experiment the antibiotic was tested at a single concentration, usually of the order of 10 times that needed to inhibit the growth of sensitive pathogenic bacteria. Afterwards certain of the substances were tested against a selected range of fungi by the serial dilution method, using twofold steps from 1 in 5000 to 1 in 160,000, except with gliotoxin, which is relatively insoluble and was tested from 1 in 140,000 to 1 in 1,000,000. The results of these extended tests with claviformin and gliotoxin are shown in the accompanying table.

A check on the activity of the less stable antibiotics was performed at intervals during the period of incubation, small amounts of the liquid being removed from the tubes and tested by the cylinder-plate method (Heatley 1944) against a suitable organism such as *Staph. aureus*. To exclude the possibility that the zone of inhibition was caused not by the antibiotic concerned but by an unknown one liberated by the fungus under test, similar samples were taken from the control tubes. All were negative except one.

RESULTS

The details given in the table can be summarised as follows:

Penicillin at 100 units/c.cm. did not inhibit any of 25 species tested.

Penicillic acid (Alsberg and Black 1913, Birkinshaw et al. 1936, Oxford 1942) at 1/5500 delayed the growth of 9 out of 20 species tested. Its activity fell off fairly rapidly during incubation.

Helvolic acid (Chain et al. 1943, Waksman and Geiger 1944) at 1/5500 had no appreciable inhibitory effect on 26 species tested; its antibacterial activity was unimpaired after 2 weeks.

Gliotoxin (Johnson et al. 1943, Weindling and Emerson 1936) at 1/140,000. Twenty-six species were tested in the first instance; 10 of them were tried again later at the same and at greater dilutions. Five species were completely inhibited, and 11 had their growth retarded; the rest were not inhibited at all. Since gliotoxin soon loses its activity under these conditions, the negative results should be accepted with reserve.

Claviformin (Chain et al. 1942, 1944, Birkinshaw et al. 1943, Bergel et al. 1943, Hooper et al. 1944). A preliminary series of tests at 1/11,000 showed inhibition of 17 out of the 24 species tested. A further series at dilutions ranging from 1/10,000 to 1/160,000 showed complete inhibition of 28 out of 33 species, partial inhibition of 3, and no inhibition of 2 species.

Aspergillic acid (White and Hill 1943, Jones et al. 1943) at 1/5000 and *cheiroline*† at 1/5000 both completely inhibited the growth of all the 37 species examined. Serial dilution tests on these substances would have been carried out, but the work had to be concluded at this stage owing to external circumstances. The results obtained with *mycophenolic acid* (Alsberg and Black 1913, Clutterbuck et al. 1932) are to be published separately (Florey et al. 1946).

SUMMARY

Among the seven antibacterial substances of natural origin tested against fungi pathogenic to man claviformin and gliotoxin appear to be powerful. Gliotoxin is, however, unstable under certain conditions. Aspergillic acid and cheiroline would possibly repay further investigation. Another active substance, mycophenolic acid, is the subject of a separate communication.

I am indebted to Miss P. McKegney and Mr. A. Haynes for technical assistance.

† Cheiroline is a substance extracted from the seeds of the wallflower. A note on its biological properties will be published separately.

REFERENCES

Alsberg, C. L., Black, O. F. (1913) *U.S. Dept. Agric. Bur. Plant Indust. Bull.* No. 270.
Bergel, F., Morrison, A. L., Moss, A. R., Klein, R., Rinderknecht, H., Ward, J. L. (1943) *Nature, Lond.* **152**, 750.
Birkinshaw, J. H., Bracken, A., Greenwood, M., Gye, W. E., Hopkins, W. A., Michael, S. E., Raistrick, H. (1943) *Lancet*, ii, 625.
— Oxford, A. E., Raistrick, H. (1936) *Biochem. J.* **30**, 394.
Burlingame, E. M., Reddish, G. F. (1939) *J. Lab. clin. Med.* **24**, 765.
Chain, E., Florey, H. W., Jennings, M. A. (1942) *Brit. J. exp. Path.* **23**, 202; (1944) *Lancet*, i, 112.
— — — Williams, T. I. (1943) *Brit. J. exp. Path.* **24**, 108.

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MYCOPHENOLIC ACID

AN ANTIBIOTIC FROM *PENICILLIUM BREVI-COMPACTUM* DIERCKX

H. W. FLOREY, M.B. Adelaide, F.R.S.
K. GILLIVER*, B.A. Camb.
M. A. JENNINGS, B.M. Oxfd
A. G. SANDERS, M.B. Lond.
Sir William Dunn School of Pathology, University of Oxford

WILKINS and Harris (1943) demonstrated that the growth of *Penicillium brevi-compactum* Dierckx (National Collection of Type Cultures no. 3568) on a liquid medium produced something which inhibited the growth of *Staph. aureus* though not of *Bact. coli* or *Ps. pyocyanea*. Previously (1942) they had reported that another strain of *P. brevi-compactum* (N.C.T.C. no. 6306) was inactive.

METHOD

Penicillium brevi-compactum (no. 3568) was grown at 24° C on 2% malt extract in distilled water or on modified Czapek-Dox medium with the addition of corn-steep liquor. The antibiotic was not produced on Czapek-Dox in the absence of corn-steep liquor. The antibacterial activity of the medium was followed by the plate and cylinder method (Heatley 1944), the plates being seeded with a 16–20 hour broth culture of *Staph. aureus* (H strain, N.C.T.C. no. 6571) diluted 1/1000. Inhibitory activity began to show in about 7 days, and there was no measurable increase after the end of the 2nd week.

Method of Extraction.—The brew was acidified to pH 2 with HCl and then agitated with an equal volume of amyl acetate. The resulting emulsion was broken with a Sharples centrifuge. The amyl acetate was evaporated in vacuo to a small bulk. Purification of the active material was first accomplished by chromatography on an alumina column, but later, when the nature of the substance was recognised, the amyl acetate was evaporated off completely. The resulting oil was taken up with alcohol. The alcoholic solution was then precipitated by alcoholic potash according to the procedure of Clutterbuck et al. (1932). The precipitate was dissolved in water and reprecipitated by acid. This precipitate was soluble in hot water, from which the active substance crystallised as needles on cooling. The residual pigment was removed by the addition of a small amount of carbon to the sodium salt of the acid crystals. The free acid was again precipitated by the addition of sulphuric acid. The material was recrystallised from boiling water once or twice more. When the crystalline active material was examined, it was clear that it was mycophenolic acid (Gosio 1896, Alsberg and Black 1913, Clutterbuck et al. 1932, Clutterbuck and Raistrick 1933, Oxford and Raistrick 1933).

ANTIBACTERIAL ACTION

Serial dilutions of sodium mycophenolate in 5 c.cm. of broth were inoculated with one drop of culture of various bacteria and were incubated overnight at 37° C (table 1). The results show that the action of mycophenolic acid is stronger against the gram-positive than against the gram-negative organisms, and that the inhibitory effect, as read after 16–18 hours' incubation, is strikingly affected

* With a grant from the Agricultural Research Council.

DR. SANDERS : REFERENCES (*continued*)

Clutterbuck, P. W., Oxford, A. E., Raistrick, H., Smith, G. (1932) *Biochem. J.* **26**, 1441.
Emmons, C. W. (1933) *Arch. Derm. Syph., N.Y.* **28**, 15.
Florey, H. W., Gilliver, K., Jennings, M. A., Sanders, A. G. (1946) *Lancet*, i, 46.
Gilliver, K. (1946) to be published.
Heatley, N. G. (1944) *Biochem. J.* **38**, 61.
Herrick, J. A. (1945) *Proc. Soc. exp. Biol., N.Y.* **59**, 41.
Hooper, I. R., Anderson, H. W., Skell, P., Carter, H. E. (1944) *Science*, **99**, 16.
Johnson, J. R., Bruce, W. F., Dutcher, J. D. (1943) *J. Amer. chem. Soc.* **65**, 2005.
Jones, H., Rake, G., Hamre, D. M. (1943) *J. Bact.* **45**, 433.
Keeney, E. L. (1943) *Bull. Johns Hopk. Hosp.* **73**, 379.
Oxford, A. E. (1942) *Biochem. J.* **36**, 438.
Peck, S. M., Rosenfeld, H. (1938) *J. invest. Derm.* **1**, 237.
Robinson, H. J., Smith, D. G., Graessle, O. E. (1944) *Proc. Soc. exp. Biol., N.Y.* **57**, 226.
Sharlit, H., Muskatblit, E. (1932) *Arch. Derm. Syph., N.Y.* **25**, 615.
Smyth, H. F., Smyth, H. F., jun. (1932) *Ibid*, **26**, 1079.
Stokes, J. L., Peck, R. L., Woodward, C. R., jun. (1942) *Proc. Soc. exp. Biol., N.Y.* **51**, 126.
Waksman, S. A., Geiger, W. B. (1944) *J. Bact.* **47**, 391.
Weindling, R., Emerson, O. H. (1936) *Phytopath.* **26**, 1068; **27**, 1175.
White, E. C., Hill, J. H. (1943) *J. Bact.* **45**, 433.

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by the size of inoculum used. Thus the titre for complete inhibition of the staphylococcus was 64 times greater when the inoculum was a thousand times less.

This phenomenon associated with inoculum size is well known and can probably be demonstrated to a greater or lesser degree with nearly all antibacterial substances, but with mycophenolic acid it appeared to be unusually well-marked. Some observations made at this time as to its mechanism will be mentioned briefly, but the subject has been taken up by Dr. E. P. Abraham (1945) with much more refined methods than those we used.

TABLE I—ANTIBACTERIAL ACTION OF MYCOPHENOLIC ACID

Organism	Inoculum (1 drop)	Titre of inhibition		
		Complete	Partial	None
Staph. aureus (H strain)	Undiluted broth culture	1000	8000	16,000
	Broth culture diluted 1 : 1000	64,000	128,000	256,000
Strep. pyogenes	Undiluted serum broth culture	< 1000	1000	2000
C. diphtheriæ	Undiluted serum broth culture	..	..	< 4000
	Serum broth culture diluted 1 : 1000	< 4000	4000	8000
C. xerosis	Undiluted broth culture	..	..	< 4000
	Broth culture diluted 1 : 1000	4000	8000	16,000
Salm. typhi	Broth culture diluted 1 : 1000	..	..	< 1000
Bact. coli	Ditto	..	..	< 1000

(1) There was apparently no destruction of mycophenolic acid by the bacteria, for, if at the end of a dilution test the tubes were centrifuged and the broth tested on plates for antibacterial activity, the zones of inhibition were the same, whether it had produced no inhibition (*Strep. pyogenes* and *Bact. coli*) or partial or total inhibition (*Staph. aureus*).

(2) The resistance of bacteria to mycophenolic acid was investigated in the following experiment. A dilution series read as follows after 24 hours' incubation :

One part mycophenolic acid in :	32,000	64,000	128,000	256,000	Control
Growth of *Staph. aureus*	Nil	Nil	Nil	++	+++

It was returned to the incubator for another 24 hours, and then read :

One part mycophenolic acid in :	32,000	64,000	128,000	256,000	Control
Growth of *Staph. aureus*	+	++	++	++	+++

If resistant forms were present, they might be expected to be found in the culture which grew in the presence of 1 in 32,000 mycophenolic acid. The resistance of this culture was therefore compared with a control in a serial dilution test, by which it appeared to be 16 times more resistant. When streaked on an agar plate radially round a cylinder containing 1 in 200 mycophenolic acid, the resistant culture showed a few resistant colonies growing inside the main ring of inhibition, but the greater part of the streak was inhibited at the same level as the control. The sensitive and resistant colonies were picked off into broth, and after overnight incubation these cultures were again streaked out ; the sensitive and resistant strains remained true to type. Thus it appeared that some resistant bacteria were present, though the majority were sensitive. There was no evidence as to whether the resistance was natural or acquired.

(3) The capacity of staphylococci to acquire resistance was investigated by daily passage in vitro through partially inhibitory concentrations of mycophenolic acid, the passaged and control cultures used to inoculate the new medium each day being brought to the same opacity. By this method it was shown that at the 2nd culture there was a 2- or 4-fold increase in resistance, at the 3rd a 16-fold increase, and at the 4th a further increase. Thus a fairly rapid rate of acquiring resistance was demonstrated.

This small series of experiments produced no conclusive evidence as to the effect of the inoculum size, though the speed with which resistance could be acquired in vitro suggested that this might at least partly explain it.

The appearance of the zones of inhibition on test plates was of some interest. It is not uncommon for an antibiotic in dilute solution to give a zone with a diffuse edge of partial inhibition. With this substance the effect was particularly well-marked, and on a plate sown with a 1 in 1000 dilution of a staphylococcus culture an inhibition ring with a diameter of 18 mm. or more might have pinpoint colonies growing right up to the cylinder. More concentrated solutions gave complete inhibition but always grading off at the edge through a considerable zone of partial inhibition. On a plate sown with an undiluted broth culture of the staphylococcus even concentrated solutions did not produce complete inhibition but only a ring of lighter though still confluent growth.

Effect of Serum.—This was tested by the plate and cylinder method. Various concentrations of sodium mycophenolate in water were mixed with an equal quantity of horse serum and the mixtures incubated at 37° C for several hours. Cylinders were then filled and the plates incubated overnight. The serum somewhat reduced the activity of the mycophenolic acid, but the residual activity was always considerably more than 50%. Serum heated to 57° C for 2 hours gave the same result as normal serum.

TOXICITY

(1) *To Leucocytes.*—This was tested by the method previously described (Abraham et al. 1941). At a concentration of 1/200 most of the leucocytes were killed immediately, but a few survived, and some cells were still just alive even at 5 hours. At 1/500 the motility of most cells was less than in the control, but they did not die till after 3 hours. At 1/1000 there was no significant difference from the controls. The results of repeated tests were consistent.

(2) *To Mice.*—Mice weighing 18–21 g. were injected. Sodium mycophenolate 1 mg. in 0·1 c.cm. of water given *intravenously* was without effect ; 2 mg. produced slight, and 5 mg. more prolonged sickness ; 10 mg. was about the lethal dose, killing one mouse in 2 hours, while another recovered.

After the administration of 10–20 mg. into the *stomach* there was transient sickness, and 40 mg. killed in 10 minutes.

After the *subcutaneous* injection of 10 mg. in 0·1 c.cm. no ill-effects were apparent. At the end of 5 hours, when the mice were killed, no œdema or other abnormality could be seen by the naked eye at the site of injection.

(3) *Local Application to Skin.*—Ointments were made up containing 1/1000 and 1/100 mycophenolic acid in soft paraffin, Haldane's emulsion base, and a mixture of equal parts of the two. Diffusion from these three bases was equal, as shown by the zone of inhibition on a seeded agar plate, and full activity was usually maintained for at least a week at room temperature.

The ointments were rubbed into a marked area of skin for 5 min. twice daily, the area being covered in the interval. No reaction of any kind was seen after several days' application.

ABSORPTION AND EXCRETION

Mice given 5 mg. intravenously and 10 mg. subcutaneously and by stomach were killed at the end of 5 hours. The liver was ground up with saline, and this extract and the 5-hours' excretion of urine were tested for the presence of the antibiotic by the plate and cylinder method. In the third group washings from the stomach and small intestine were also examined.

The urine contained a trace of antibacterial activity in the intravenous and oral groups, and a little more in the subcutaneous group. Liver extracts were negative in every mouse. After oral administration a little activity was found in the stomach washings, and a trace in the washings from the small intestine.

From these experiments it appears that mycophenolic acid is absorbed from the subcutaneous tissues and from the upper gastro-intestinal tract in the mouse. The absence of the active substance from the tissues might be accounted for if it were rapidly excreted into the urine,

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but this was not so, since the urine for the 5-hour period contained only a trace. Probably, therefore, there is considerable destruction or inactivation in the body.

INHIBITION OF FUNGI AND OF BACTERIA PATHOGENIC TO PLANTS

Some experiments were undertaken to find out whether mycophenolic acid was an inhibitor of moulds as well as of bacteria.

Saprophytic Fungi.—A cylinder was placed in the centre of a Sabouraud agar plate, and the moulds to be tested were streaked on the plate radially from the cylinder to the periphery. Streaks of *Staph. aureus* and *Bact. coli* were put on each plate as controls. The cylinder was filled with a 1% solution of mycophenolic acid and was replenished daily till the moulds were grown. The plates were incubated at 24° C.

A zone of complete inhibition, such as was seen with the staphylococcus, only developed with *Proactinomyces* (*Nocardia*) *gardneri*. Partial inhibition, shown by a tapering reduction of the growth towards the cylinder, was seen with all the other moulds tested : *Aspergillus giganteus, Penicillium frequentans, P. cyclopium, P. brevicompactum, P. spinulosum, P. janthinellum, P. olsonii, P. steckii,* and *P. notatum.* The initial growth of mycelium was hardly, if at all, delayed, but development was retarded. The growth was not only less luxuriant but also in some cases—e.g., *P. frequentans* and *P. cyclopium*—nodular and discoloured.

TABLE II—INHIBITORY EFFECTS OF MYCOPHENOLIC ACID ON PATHOGENIC FUNGI

Fungus	N.C.T.C. no.	Titre of inhibition	
		At 2½ weeks	At 4 weeks
MICROSPORUM GROUP—			
Sab. audouini	2526	5000	5000
,, ,, ...	3005	Partial*	Partial
,, *felineus*	3006	5000	Partial
,, ,, ...	2524	Partial	None
,, *lanosus*	2525	Partial	Partial
Msp. fulvum	3007	5000	Partial
,, *equinum*	3008	20,000	20,000
,, *ferrugineum*	3009	40,000	40,000
,, *japonicum*	2106	None	..
ENDOTHRIX GROUP—			
T. tonsurans	2520A	80,000	40,000
,, ,, ...	2987	80,000	Partial
,, *effractum*	2992	40,000	20,000
,, *fumatum*	2997	80,000	10,000
,, *sabouraudii*	2521	40,000	40,000
,, ,, ...	2988	80,000	20,000
,, *louisianicum*	2786	Partial	None
,, *sulphureum*	2522	20,000	Partial
Bodinea violacea	2990	80,000	20,000
T. decolyans	2784	80,000	10,000
,, *cerebriforme*	3000	80,000	10,000
,, *plicatile*	2999	None	..
ECTOTHRIX GROUP—			
T. asteroides	3002	Partial	Partial
,, *lacticolor*	3001	20,000	Partial
,, *granulosum*	3003	5000	Partial
,, *persicolor*	2998	None	..
,, *equinum*	2996	10,000	10,000
,, *album*	2993	80,000	20,000
,, *discoides*	2995	10,000	10,000
,, *balcaneum*	704A	80,000	10,000
(,, *depressum*)	3004	None	..
FAVUS GROUP—			
Achorion gallinæ	3015	5000	5000.
,, *gypseum*	3013	None	..
,, *violaceum*	3012	80,000	20,000
,, *quinckeanum*	3011	80,000	20,000
Grubyella schönleinii ..	3010	80,000	80,000
EPIDERMOPHYTA—			
Epi. cruris	2780	80,000	20,000
,, *perneti*	3016	20,000	10,000
,, *rubrum*	702	20,000	20,000
ENDODERMOPHTA—			
Endo. indicum	703	40,000	Partial
,, *tropicale*	1758	None	..

The range of the twofold dilution series was from 1 in 5000 to 1 in 80,000. Figures show the highest dilution of mycophenolic acid which completely inhibited growth (1 in...). In most cases where complete inhibition is recorded at a low dilution there was also partial inhibition at higher dilutions.

* Where partial inhibition is recorded, growth was diminished but not totally suppressed at 1 in 5000 and usually at one or more higher dilutions also.

T. depressum appears in parentheses because its group is not determined.

T. cerebriforme and *T. plicatile* are often classed separately in the neo-endothrix group.

Fungi Pathogenic to Man.—The inhibitory effect of mycophenolic acid on the growth of some of the pathogenic fungi was tested in a liquid medium. A sterile solution of sodium mycophenolate was added in measured amounts to test-tubes containing 5 c.cm. of glucose-peptone water. The tubes were inoculated and were incubated at 24° C. The first set of experiments, in which there was a final concentration of mycophenolic acid of 1/6000 in the tubes, was sufficiently encouraging for a set of twofold serial dilutions from 1/5000 to 1/80,000 to be prepared. The growth in the tubes was examined at 2½, 4, and 5½ weeks, but little additional information was gained by the last inspection. The results are recorded in table II. In addition to the stock cultures, four strains recently isolated from cases of ringworm were tested, one each of *Epidermophyton floccosum, Trichophyton asteroides, T. rosaceum,* and *T. rubrum.*† These were completely inhibited at 1/80,000, 1/10,000, 1/20,000, and 1/20,000 respectively.

Various methods have been proposed for testing the fungicidal as distinct from the fungistatic power of antiseptic substances. Burlingame and Reddish (1939) considered that the closest correlation with clinical results was achieved by immersing substantial pieces of mycelial mat—e.g., 1 cm. in diameter—in the solution to be tested for periods up to 30 min. Their principle was followed, but, instead of surface mat from cultures on agar, submerged growth from tubes of glucose-peptone water was used, thus avoiding the difficulty of wetting surface mycelium.

The experiment was done several times, with the consistent result that immersion in 1% mycophenolic acid for an hour did not prevent or even retard growth after the mycelial mass had been washed and transferred to Sabouraud agar. The moulds tested were *E. cruris* (N.C.T.C. no. 2780), *T. sabouraudii* (N.C.T.C. no. 2988), *E. floccosum, T. asteroides. T. rosaceum, T. rubrum.* The last four had recently been isolated from cases of ringworm. A 48-hour growth of *Endomycopsis albicans* (N.C.T.C. no. 714) tested in a similar way was also unaffected.

Fungi and Bacteria Pathogenic to Plants.—A number of plant pathogens were tested by the serial dilution method. Bacteria were tested in ' Lemco '-glucose broth containing twofold serial dilutions of sodium mycophenolate from 1/5000 upwards. The inoculum was 1 drop of a 1/1000 dilution of a culture of the organism in the same medium, except with the corynebacteria, where an undiluted culture was used. The tubes were incubated at 24° C, and results were read at 2 days with all except the corynebacteria, which were read at 7 days.

A few bacteria, mainly the gram-positive species, were inhibited at dilutions within the range tested :

Organism	Titre for complete inhibition, 1 part in :
Corynebacterium michiganense	320,000
Corynebacterium sepedonicum	160,000
Bacillus subtilis	20,000
Xanthomonas begoniæ	10,000
Actinomyces scabies	5000

The following were not inhibited at 1/5000, the strongest solution tested : *Bacillus polymyxa, Bacterium aroideæ, Bact. carotovorum, Bact. tumefaciens, Leuconostoc* sp., *Pseudomonas marginalis, Ps. syringæ, Xanthomonas campestris, X. malvaceanum.*

The *fungi* chosen were those which could readily be grown in culture and tested by a similar method. Fourfold dilution series of mycophenolic acid, from 1/5000 upwards, were set up in liquid Sabouraud's medium and inoculated with the fungi. The following species were inhibited :

Organism	Titre for complete inhibition, 1 part in :
Stereum purpureum	80,000
Verticillium dahliæ	20,000
Claviceps purpurea	20,000
Phytophthora erythroseptica	20,000
Rhizoctonia crocorum	20,000
Rhizoctonia solani	5000

The remaining fungi tested showed partial but not complete inhibition at 1/5000 : *Alternaria citri, Botrytis*

† Strains kindly provided by Dr. J. T. Duncan, of Winchester.

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cinerea, Byssochlamys fulva, Cephalothecium roseum, Cladosporium herbarum, Fusarium avenaceum, F. culmorum, Glœosporium musarum, Myrothecium roridum, Penicillium digitatum, P. expansum, Pythium ultimum, Sclerotinia sclerotiorum.

DISCUSSION

Mycophenolic acid enjoys the distinction of being the first antibiotic produced by a mould to be crystallised. This was accomplished by Gosio (1896) during his investigations on pellagra, which at that time was thought to be associated with some toxin from spoiled maize. One of the moulds apparently concerned with the spoiling was a *Penicillium glaucum*, which Gosio identified and isolated. From culture media on which the mould had grown he purified a substance which he recognised to be of a phenolic nature. He found out that it was capable of stopping the growth of the anthrax bacillus, but he was only able to isolate minute amounts, and he lamented his inability to do any toxicity tests on animals, owing to lack of material.

Alsberg and Black (1913) remarked on the low toxicity of the substance, which they named mycophenolic acid. They stated that 10 mg. given subcutaneously to mice was without effect. Clutterbuck et al. (1932, 1933) and Oxford and Raistrick (1933), who concluded from Gosio's description that his mould was one of the *P. brevi-compactum* series, studied its production from various strains of the series and its chemical properties. Neither of the later groups of workers recorded any observations on its bacteriological properties.

As an antibacterial substance mycophenolic acid seldom reaches titres of the order of 1 in 100,000 or over. It has, however, one or two points of interest. It shows to an unusual degree the "inoculum size" phenomenon—alteration of the inhibitory titre inversely with the number of bacteria implanted. This may be important in throwing light on the mode of action of this and other antibacterial substances. In-vitro mycophenolic acid inhibits the growth of many strains of fungi pathogenic to man and plants at titres up to 1 : 80,000, though apparently even strong solutions are incapable of killing them under the conditions of experiment.

SUMMARY

Mycophenolic acid, one of the metabolic products of *Penicillium brevi-compactum* Dierckx, is responsible for the antibiotic activity previously reported for this species.

Its antibacterial effects are greatly affected by inoculum size.

It has considerable powers of inhibiting the growth of some pathogenic fungi.

We are indebted for technical assistance to Miss P. McKegney, Miss P. Morris, and Mr. J. Kent; and to the Medical Research Council and the Rockefeller Foundation for grants towards materials and technical assistance.

REFERENCES

Abraham, E. P. (1945) *Biochem. J.* in press.
Abraham et al. (1941) *Lancet*, ii, 177.
Alsberg, C. L., Black, O. F. (1913) *U.S. Dep. Agric. Bur. Plant Indust. Bull.* no. 270.
Burlingame, E. M., Reddish, G. F. (1939) *J. Lab. clin. Med.* **24**, 765.
Clutterbuck, P. W., Oxford, A. E., Raistrick, H., Smith, G. (1932) *Biochem. J.* **26**, 1441.
— Raistrick, H. (1933) *Ibid*, **27**, 654.
Gosio, B. (1896) *Riv. Ig. San. publ.* **7**, 825, 869, 961.
Heatley, N. G. (1944) *Biochem. J.* **38**, 61.
Oxford, A. E., Raistrick, H. (1933) *Biochem. J.* **27**, 1473.
Wilkins, W. H., Harris, G. C. M. (1942) *Brit. J. exp. Path.* **23**, 166; (1943) *Ibid*, **24**, 141.

THE Medical Practitioners Union has been greatly concerned by the difficulties experienced by doctors returning to practice after service with the Forces: "practices have vanished, incomes have melted, premises have been requisitioned, resettlement grants are hard to obtain, and hosts of other problems arise." With a view to ameliorating these conditions the union has formed a Services and ex-Services section, with a committee composed of recently demobilised doctors, who aim at keeping in touch with potential sources of part-time employment. The design of the section is "to ensure, so far as may be possible, that no doctor shall suffer hardship purely because of service in His Majesty's Armed Forces." The intention is to consider the interests of the consultant equally with those of the general practitioner.

SURGERY IN MALARIA

ERIC PARRY
M.B. Lpool, F.R.C.S.E.
COLONEL I.M.S.

IT seems likely that, with the return home of men infected with malaria and in need of surgical intervention, some of the conditions described here may become familiar to surgeons in the U.K. In any man who has served in a malarious area malaria may be lurking ready to precipitate an acute emergency on the slightest surgical manœuvre.

All the cases cited are of malignant tertian infection by *Plasmodium falciparum*. This is the type of malaria which gives rise to dangerous complications, and it has also the faculty of concentrating its attack on one particular organ or site, thus causing the localised symptoms to be described, which lead to such confusion in diagnosis. It is fortunately curable with prophylactic mepacrine given for 28 days after leaving the infected area.

HÆMORRHAGE

The wounds of patients who suffer from malaria do not heal normally. It is customary to ascribe this loosely to lowered resistance. It is observed, however, that in many cases there is a tendency to hæmorrhage. This may give rise to a hæmatoma, with the attendant risk of suppuration, or to a frank hæmorrhage at any post-operative stage. Further the hæmorrhage can lead to mistakes in diagnosis, for the malaria will often manifest itself clinically by some form of bleeding for which surgical aid is sought. It is my aim to emphasise the importance of this manifestation of malaria.

CASE 1.—A Madrasi N.C.O. was admitted to hospital on June 16, 1944, having been knocked from a motor-cycle. His general condition was good, he was not thirsty, his blood-pressure was 120/85. He had a compound fracture of both bones of the left leg, the wound lying over the fibula at the junction of its lower and middle thirds. There was also a lacerated wound on the inner aspect of the right thigh, which at subsequent operation was found to have raised a flap of skin and tissue, exposing the lower angle of the femoral triangle.

Wound toilet and excision on customary lines was carried out. The left limb was immobilised in a complete plaster cast. Hæmostasis appeared entirely satisfactory, and as regards the right thigh, where there was no bone or muscle damage, this was a simple matter.

Some three hours after return to the ward he had a sudden brisk hæmorrhage from both wounds simultaneously. The plaster on the left leg and the dressings on the right thigh were soaked with blood. The pulse was rapid, and its pressure low. Plasma was transfused, but he had received only a few c.cm. when he had a severe rigor. After 10 min. the skin was becoming hot, the pulse was much improved, and the temperature 100·5° F. The plasma was stopped, a blood smear taken, and quinine bihydrochloride gr. 6 given intravenously.

Within 2 hr all signs of hæmorrhage had disappeared, and the patient, who had been restless, clammy, and cold, was comfortable. The blood smear contained *P. falciparum*. He was given a routine course of antimalarial drugs, subsequent convalescence was uneventful, and he was evacuated on Aug. 13 with his wounds healed and fracture united.

Hæmorrhage in this case may have been reactionary, but its simultaneous onset in two wounds, synchronising with an attack of malarial fever, is significant. Prompt diagnosis and treatment were followed by a good result. In the next case to be described the connexion between the hæmorrhage and malaria was not realised, and owing to difficulty in evacuation sustained antimalarial treatment was not given; hence the hæmorrhage recurred.

CASE 2.—On May 12, 1944, a sapper was pierced in the left side of the neck by a piece of bamboo. The wound evidently bled freely and was sutured with two S.W.G. sutures, which controlled the hæmorrhage. The patient had fever at the time and was put on oral quinine, conditions precluding laboratory diagnosis of malaria. The drug controlled the fever and was continued up to and including the 18th.

On the 20th a "blood blister" formed at the lower end of the wound, and on being pricked bled continuously. He again ran a temperature and was put on a course of sulphanilamide.

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In the early hours of the 23rd, while awaiting evacuation, he had a brisk hæmorrhage, which went unnoticed in the darkness but, judging by the state of the clothes and surroundings, must have been well over a pint.

On the 24th he was evacuated by jeep. On arrival at a medical unit on the 26th he was in an exhausted condition, and that night a hæmorrhage took place from his wound, which was controlled by pressure from a pad, and he was given 1 pint of plasma.

He arrived at this hospital by air on the 28th, his general condition being fair, his temperature 99·8° F. There was a wound along the anterior border of the left sternomastoid, 1 in. long, healed except for a punctate opening at the lower end, from which blood was trickling. The laboratory reported the presence of *P. falciparum* in the blood, and the patient was placed on the routine antimalarial course after an intravenous injection of quinine. The oozing ceased during the day, and hæmorrhage did not recur.

This case shows hæmorrhage controlled on 2 occasions by treatment with antimalarial drugs. At no stage was there any suggestion that infection was the cause, and it seems reasonable to ascribe the bleeding to malaria.

CASE 3.—A Madrasi pioneer was admitted on June 14, 1944, with a fracture of the pelvis, with wide separation of the pubic bones and a rupture of the urethra. At operation a catheter was threaded through the urethra, and the bladder drained with a suprapubic catheter.

On the 4th night after operation blood was found oozing from the urethra. This had ceased by morning, but on the evening of the 5th day his temperature rose, and he had a brisk hæmorrhage from the meatus during the night, and was still oozing in the morning. The blood contained *P. falciparum*, he was given intravenous and then oral quinine, no further bleeding took place, and he recovered uneventfully.

Apart from postoperative bleeding, malaria often manifests itself by hæmorrhages; hence it is not uncommon for a surgeon to be asked for his opinion on what is simply a case of malaria.

CASE 4.—A British officer, aged 48, reported with a history of 3 attacks of profuse epistaxis on the previous day and 1 that morning. He had not had epistaxis before. The blood-pressure was normal. No local cause was found, there was no pyrexia, and he had not felt feverish, but had had slight headache for the past 3 days. The blood was found to be heavily infected with *P. falciparum*. No further epistaxis developed after the start of antimalarial treatment. In this case the hæmorrhage was unaccompanied by pyrexia.

In the 2 following cases hæmorrhage into an adenoma of the thyroid coincided with an attack of malaria.

CASE 5.—A Gurkha rifleman was admitted with fever and with pain and swelling in his neck. On examination there was a small tender nodule in the right thyroid lobe, which had become tender and had enlarged only in the course of the previous 48 hr. He was found to have malignant tertian malaria. The swelling and tenderness subsided during the course of antimalarial treatment.

CASE 6.—An ambulance sepoy was admitted on Sept. 1, 1944, with a swelling in his neck of some years' duration. Two months previously he had been in hospital with malaria; the swelling had become noticeably larger then. As the increase had not subsided he asked for operation.

On examination the rt lobe of the thyroid was greatly enlarged. At operation the swelling was found to consist chiefly of a large cyst containing blood and several small cystic adenomata. A rt subtotal thyroidectomy was performed. In view of the recent history of malaria, a 3 days' course of quinine was given before operation, and a further 3 days' course after operation. Convalescence was uneventful.

Although adenomata of the thyroid are liable to hæmorrhage, 2 such cases during attacks of malaria are interesting examples of the hæmorrhagic tendency of malaria.

ABDOMINAL PAIN

The list of clinical pictures to which this hæmorrhagic tendency of malaria can give rise is legion, and it will suffice to mention as important, in that they have been often seen in this theatre of war, hæmaturia and bleeding per rectum. There are also 2 other groups of symptoms which often lead to confusion: (1) abdominal pain is a not uncommon presenting feature of an attack of malaria, and (2) malaria readily simulates various lung conditions. Both are associated, as is suggested below, with the same hæmorrhagic pathology.

In my experience the type of abdominal pain due purely to malaria seldom gives any clear indication for laparotomy. It is most often right-sided and is not preceded by midline or generalised pain. Tenderness and rigidity are commonly present, usually over a wide area. In fact, the pain suggests a primary peritoneal lesion rather than one associated with disease of a viscus, and this is borne out by the appearances at laparotomy.

CASE 7.—A clerk, aged 47, was brought to hospital with right-sided pain of about 12 hrs' duration without any preceding generalised pain. There had been no vomiting. Temperature was 100·2° F, pulse-rate 92, tongue furred, and breath offensive. There were tenderness and rigidity in the right iliac fossa. No abnormality was found on rectal examination.

Operation was undertaken through a McBurney incision. There was intense congestion of the appendix, of a large area of cæcum, and of the opposed parietal peritoneum. There were numerous subserous petechial hæmorrhages over the congested area. The abdomen contained a little free serous fluid. Appendicectomy was performed. The mucosa of the appendix showed no obvious signs of disease.

About 8 hr after operation the patient felt shivery, and his temperature rose to 104° F. A blood slide showed *P. falciparum*. Intravenous quinine, followed by a routine oral course of treatment, was given. The temperature was controlled. Convalescence was marred by the formation of a large subcutaneous hæmatoma, with a subsequent breaking down of the skin wound.

The presence of malarial parasites in the blood should not deter the surgeon from laparotomy where the indications are clear. Such a finding is invaluable in assessing the conduct of the case but should never be allowed to alter the surgeon's interpretation of his findings. Malaria in any one patient often manifests itself in the same way. Thus, one patient has been admitted to this hospital on 3 occasions with abdominal pain, which has in each case been associated with malaria and has cleared up with antimalarial treatment. It is no novelty to be told by the layman that he knows he is in for a "go of malaria" because of such and such a symptom.

BRONCHOPNEUMONIA

As regards the lungs, malarial infection is liable to concentrate on them after an inhalation anæsthesia (just as it tends to cause cerebral malaria after intravenous anæsthesia).

CASE 8.—A Madrasi was admitted in July, 1944, with an oblique inguinal hernia and was operated on under gas-oxygen and ether, the sac being excised, no repair being considered necessary. Two days after operation his breathing became rapid and distressed, he felt tightness and pain in the chest, and was expectorating a fair amount of pink-tinged frothy mucus. Rales and rhonchi were present over the lower lobes on both sides. Routine examination of the blood revealed the presence of *P. falciparum*, and the chest rapidly cleared on the institution of a course of quinine, there being no symptoms or signs after another 48 hr.

I have examined the lungs of 3 patients who had died of what was thought to be a bronchopneumonia. In each case there were areas of the lung showing intense congestion, and smears from these showed the presence of the *P. falciparum*. Here again the same underlying pathology is evident, and it is obviously important to be aware of the possibility of a postoperative bronchopneumonia being due to malaria.

TREATMENT

Treatment of malaria has now been standardised, and results have been almost revolutionised by the use of mepacrine. To anyone who has been in the far-eastern theatre of war since its beginning the beneficial changes wrought by this drug are little short of miraculous. Free use has been made, in this small series of cases, of intravenous quinine as a preliminary treatment. This is simply because speedy control is so often essential, and I regard quinine as the only antimalarial drug that can be given intravenously and therefore to have still a place in the treatment of surgical cases complicated by malaria.

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SUMMARY

The importance of malaria, in causing hæmorrhages, whether large or petechial, is emphasised as a factor leading to confusion in diagnosis and to complications after operation.

The value of prompt intravenous use of quinine in surgical cases where malaria is suspected is illustrated.

I wish to thank Major-General W. E. Tyndall, C.B.E., M.C., Director of Medical Services, ALFSEA, for permission to publish.

HEPATITIS AFTER PENICILLIN INJECTIONS

LEONARD HOWELLS B.Sc. Wales, M.D. Lond., M.R.C.P.
J. D. OLAV KERR M.B. Glasg.
LIEUT-COLONELS R.A.M.C., OFFICERS I/C MEDICAL DIVISIONS OF A GENERAL HOSPITAL

IN recent years great interest has been aroused by the possibility of transmitting icterogenic agents by injections, and the evidence on the rôle of syringes in this connexion has been summarised in a memorandum by medical officers of the Ministry of Health.[1]

We have treated in military practice 47 patients with hepatitis who had received penicillin injections. This number represents 20% of the admissions for hepatitis under our care, at one hospital during five months and at another during a much shorter period. Attention is drawn to these cases because the development of hepatitis after penicillin injections may be more frequent than is realised. In 41 of our cases penicillin had been given for venereal disease, and 2 of the remaining cases had also received their injections at a venereal disease treatment centre (V.D.T.C.).

MATERIAL

The following are the numbers of cases of diseases for which penicillin was given :

Gonorrhœa	27	Abscess of forehead	1
Syphilis	14	Penetrating wound of shoulder	1
Non-venereal urethritis	1	Impetigo	1
Vincent's gingivitis	1	Total	47
Axillary adenitis	1		

Of the 47 patients, 36 had received their penicillin treatment at the same V.D.T.C.; 1 of these attended this centre for the treatment of Vincent's gingivitis and received his initial treatment on the same day as one of the patients with venereal disease who developed jaundice subsequently. Both became icteric on the same day, and the degree of jaundice was equal in the two cases. The remaining 11 patients received their penicillin at different medical units, 7 being at V.D.T.C. and 4 at general hospitals. So far as can be discovered, there is no connecting link between them. The dates when penicillin injections were started ranged from Dec. 12, 1944, to April 27, 1945. The cases appeared to be fairly evenly distributed throughout this period. In two instances 2 patients received the injections on the same day at the same centre; 8 patients were given more than one course of injections, but the date of the first has been taken in computing the latent period. The usual dose received was 120,000 units for gonorrhœa and 2,400,000 units for syphilis.

NATURE OF HEPATITIS

Latent Period.—The average period between injections and onset of icterus for the whole group was 97 days, with a lower limit of 62 days and a higher limit of 157 days. There was no significant variation in latent period between the different diseases.

Jaundice.—The degree of jaundice was as follows :

	Gonorrhœa	*Syphilis*	*Others*	*Total*
Slight	10	3	—	13
Moderate	13	9	4	26
Severe	4	2	2	8
Total	27	14	6	47

Jaundice lasted on an average 21 days, with a minimum of 10 and a maximum of 44 days. The length of stay in hospital was on an average 30 days, with a minimum of 15 and a maximum of 49 days.

1. See *Lancet*, 1945, ii, 116.

Disposal of cases :

Returned to duty	12	Evacuated to U.K.	10
Convalescent depot	18	Remaining in hospital	7

In general the clinical features were identical with those found in infective hepatitis seen during the same period, and complications were rare.

RELEVANT FACTORS AT PRINCIPAL V.D.T.C.

In view of the very high proportion of patients who had received their penicillin treatment at the same V.D.T.C. we visited it and discussed the problem with the specialist in charge. During the period concerned 1600 cases were treated with penicillin injections at this centre. As a routine each syringe is used for about 5 patients, the syringe being boiled frequently but not necessarily between each case. Syringes are never used for withdrawing blood from a vein, so contamination from this source is unlikely. Needles are cleaned after each injection, and then several are wrapped together in wool and boiled. No needle is ever used for two successive injections without intermediate sterilisation as described. The injections are given by sisters or by trained orderlies, who change frequently owing to the exigencies of the service. None of them have been known to have jaundice at any time. The penicillin solutions were made up in multiple doses in rubber-capped bottles; but it is unlikely that these bottles could become infected during use, because the needle used for filling the syringe was not the needle used for the injection.

Two patients with jaundice (not included in our 47 cases) were admitted to the centre in mid March, 1945, having received penicillin for venereal disease some ten weeks previously. This brings the total of known cases in this centre to 38. During the period under review a few cases of postarsenical jaundice were treated at the centre and were given penicillin by the same technique and with the same needles and syringes as all the other patients.

It is not known for certain whether there have been any other cases which may have been admitted to some of the other hospitals in the area served by the V.D.T.C. It seems unlikely that one general hospital would have received more than a proportion of the total number, and on the basis of probability it is reasonable to conclude that there must have been others. The fact that some of our cases had been transferred to us from other hospitals without the link with penicillin injections having been recognised is proof of this. Accordingly, no attempt is made to express the incidence of jaundice as a percentage of cases treated.

CONCLUSIONS

These cases are examples of hepatitis developing in patients who had received injections in penicillin therapy some considerable time previously.

With [illegible] important implications conclusions must be made with caution, but it is thought that penicillin is not the direct cause of the hepatitis, which may be due to some icterogenic agent—e.g., a virus—transmitted by faulty injection technique. The fact that so many of our cases had been treated at the same V.D.T.C., together with the length of the latent period, favours this theory, and it seems likely that the cause is analogous to that responsible for late jaundice after antisyphilitic arsenical therapy.

Although the majority (36 cases) had been treated at the principal V.D.T.C. for a large area, yet among our 47 patients the penicillin treatment had been given at no less than twelve different medical units. This wide distribution suggests that the development of hepatitis after penicillin injections is more frequent than is generally realised, and probably a greater awareness of this association would have led to the recognition of even more cases.

It follows that penicillin injections must be carried out with scrupulous care and every precaution taken to avoid transmitting an icterogenic agent.

These facts merit attention so that the condition may be recognised more widely and the cause studied and if possible eradicated.

We wish to thank Colonel F. G. Flood, M.C., and Colonel J. M. Ryan, officers commanding general hospitals, for permission to publish this report.

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FŒTAL DYSPLASIA OF LEG

A NEW OPERATIVE APPROACH

THE LATE
H. ECKSTEIN
M.D. Munich
TEL-AVIV

F. M. P. ECKSTEIN
M.B. Camb.
OF THE DEPT. OF ANATOMY, MEDICAL SCHOOL, UNIVERSITY OF BIRMINGHAM

LIMB deformities of a type loosely termed "amniotic constrictions" are found as rare congenital abnormalities. They consist, as a rule, of annular scar-like depressions of the skin of variable depth, which may involve the entire circumference of an extremity. Severe instances may be accompanied by the loss of all tissues distal to the constriction (the so-called fœtal amputations). Even mild cases affecting only the soft tissues lead to characteristic and striking deformities. The treatment of these, as advocated in modern textbooks, consists of the excision of the scars with subsequent suture of the skin edges (Campbell 1939, Steindler 1940). However, this simple procedure is not invariably successful, as is illustrated by the case reported below. Here a satisfactory result was finally achieved by an operation which, it is believed, has not been described before.

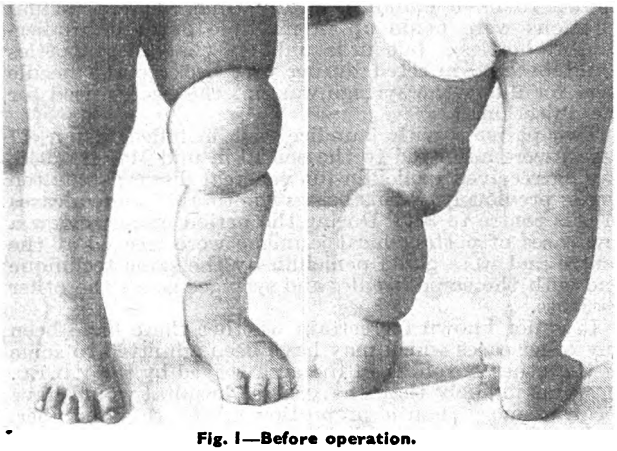

Fig. 1—Before operation.

CASE-RECORD

A girl, aged 2 years, was referred to one of us (H. E.) by Dr. E. Spira, of Tel-Aviv, and later treated in conjunction with him. When first seen her left leg was grossly deformed by three deep transverse constriction-rings at successive levels in the thigh and leg. The fact that one of these was above the knee constitutes a very unusual feature (Streeter 1930, Barenberg and Greenberg 1942). Between the strictures exuberant growth of the integument had taken place, so that the extremity appeared to be subdivided into 3 segments and hardly resembled a human limb. On this side also there was an associated clubfoot (fig. 1). Various fingers and toes showed similar but minor circular constrictions.

Orthodox excision of the scar on the thigh, as first carried out, led to normal healing but subsequent reappearance of the depression. Since it was thought that this might conceivably be due to the lack of subcutaneous fat beneath the scar, a modification of the operation was introduced to correct this deficiency and used on all subsequent occasions. After re-excision of all fibrous scar tissue a tongue of fat was fashioned, superficially by undercutting the proximal skin edge and deeply by dissecting along the muscle plane for a corresponding distance (fig. 2, *a* and *b*). The resulting pad of fat was then drawn across the skin gap and beneath the distal skin edge, which had also been undercut for its reception. It was finally secured in its new site with a stitch passed through it and the overlying skin, where the thread was tied over a wad of gauze. Lastly, the original incision was sutured more proximally (fig. 2 *c*). All the strictures were treated in a like manner, 9 operations being required altogether. During one of these a tenotomy to correct the clubfoot was also successfully performed by Dr. Spira.

The final result fully justified the considerable trouble taken over this case. Photographs taken a year after the last operation show that the constrictions have entirely disappeared except for a slight depression below the internal condyle. The scars now lie at the level of the skin and are soft and pliable. The limb as a whole has regained a normal outline (fig. 3); and gait is normal.

This method of subcutaneous fat transplantation might be employed with similar success in other cases in which deep-seated scars of this type have to be removed or are likely to develop.

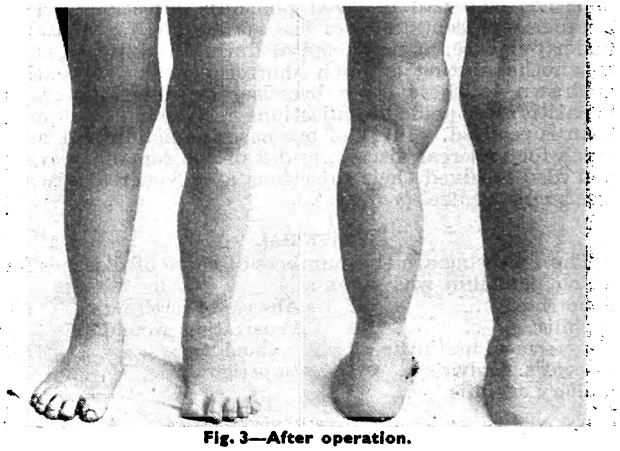

Fig. 3—After operation.

DISCUSSION

Early work on this rare and interesting condition is associated with the names of Chaussier (1812), Gurlt (1834), and especially Montgomery (1837). As a result of their observations these congenital lesions were thought to be caused by "prolongations" of the amniotic or yolk vesicles which had become attached to the fœtal limbs. Once formed, it was argued, such adhesions would inevitably become twisted and tightened by the constant movements of the fœtus, so producing constriction or even amputation. This was likened to the way in which the umbilical cord may cause strangulation if accidentally coiled round the neck of the child. In spite of some pertinent criticism by Montgomery this theory appears to have been generally accepted for nearly 100 years.

Streeter, of the Carnegie Institute in Washington, however, reached very different conclusions. In a paper which appeared in 1930 he expressed the view that such abnormalities are due to local inadequacies of the germ plasm forming the limb buds. These, in turn, lead to the formation of sharply circumscribed areas in which growth and differentiation of the component tissues are

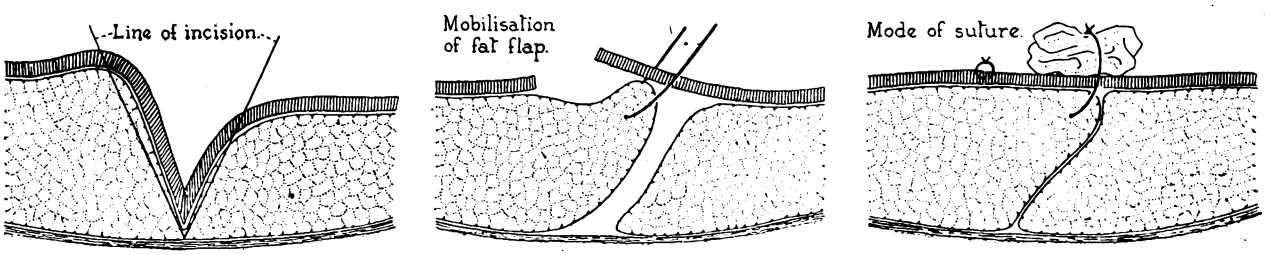

Fig. 2—(a), (b), and (c): stages in the operation.

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impaired. Naturally, there exist grades in the severity and extent of this local interference, which explains why the deformities eventually produced are not uniform but may vary from complete amputation of an extremity to mere grooving of the skin. The fibrous bands which often fill such grooves and were first observed by Montgomery are looked on by Streeter as the remaining organised traces of exudation and maceration which took place in the affected region during the phase of inhibited growth. These threads have been mistakenly interpreted in the past as amniotic adhesions. The latter may exist, but if so should be regarded as the by-products, not the causes, of the pathological process.

This modern conception has met with much approval, including that of Sir Arthur Keith (1940), who affirmed his belief in the fundamental similarity of fœtal constrictions and amputations involving extremities, on the one hand, and malformations affecting the face and trunk, such as congenital scars and fissures, spina bifida, and anencephaly, on the other. All these he would group under one common pathology, for which, in the absence of a known causal agent, he proposed the name of "Streeter's fœtal dysplasia."

Bagg's (1929) work in America provided some experimental support for the germinal theory just outlined. He subjected pregnant females of a normal strain of mice to X rays and produced in their offspring lesions which in all essentials were equivalent to those described by Streeter in human fœtuses. Bagg inferred that these abnormalities were brought about by an "alteration in the germ plasm as a result of the exposure to X-ray irradiation." He also suggested that the main factor in the production of these defects was a temporary breakdown very early during intra-uterine life in the blood-supply to the affected parts.

Grateful acknowledgement is made to Mr. W. J. Pardoe for his expert help with the illustrations.

REFERENCES

Bagg, H. J. (1929) *Amer. J. Anat.* **43**, 167.
Barenberg, L. H. Greenberg, B. (1942) *Amer. J. Dis. Child.* **64**, 87.
Campbell, W. C. (1939) Operative Orthopædics, St. Louis.
Chaussier (1812) cited by Montgomery (1837).
Gurlt (1834) *Med. Ztg.* ii, 13.
Keith, A. (1940) *Brit. J. Surg.* **28**, 173.
Montgomery, W. F. (1837) An Exposition of the Signs and Symptoms of Pregnancy, London, chap. 12.
Steindler, A. (1940) Orthopedic Operations, Springfield.
Streeter, G. L. (1930) *Contr. Embryol. Carneg. Instn.* **22**, 1.

PENICILLIN IN GONORRHŒA

S. M. LAIRD
M.D. Glasg., F.R.F.P.S., D.P.H.
MAJOR R.A.M.C.; COMMAND SPECIALIST IN VENEREOLOGY, WESTERN COMMAND

A. B. FIELDSEND
M.B. Leeds
CAPTAIN R.A.M.C.; GRADED VENEREOLOGIST

PENICILLIN has justified its early promise in gonococcal infection and "the problem has been not to establish the therapeutic value of the drug but to find a standard dosage which will produce most cures in the shortest time with the minimum amount of penicillin" (*Lancet* annotation 1945). The results obtained in an attempt to solve this problem are presented herewith.

CLINICAL INVESTIGATION

The patients were soldiers with acute uncomplicated gonorrhœa and were treated with penicillin, under our care, in one military V.D. hospital. They had received no treatment before admission. The diagnosis was established by smear examination, and after the treatment progress was controlled by examination of smears taken in the early morning before the first urination. There were no facilities for making cultures. The condition of the first morning specimen of urine was also noted, and each patient was seen daily by one of us.

Various brands (mostly American) of the sodium salt of penicillin were used. The drug was dissolved in sterile distilled water (2 c.cm. per dose) and was administered by intramuscular injections. The treatment schedules used and the results obtained are indicated respectively in tables I and II. For comparison the results obtained in similar cases treated with sulphathiazole in the same military hospital during the five quarters from October, 1943, to December, 1944, inclusive are presented in table II. The total dosage of sulphathiazole was 20 g.: 10 g. on the day of admission, followed by 5 g. daily for two days, combined with urethral irrigation and a high fluid intake. This course of chemotherapy was based on previous experience with sulphapyridine (Laird 1941, 1942).

TABLE I—TREATMENT SCHEDULES

Treatment schedule	No. of injections	Dosage per injection (Oxford units)	Interval between injections (hours)	Total dosage (Oxford units)
A	2	50,000 50,000	8	100,000
B	2	50,000 50,000	4	100,000
C	3	50,000 25,000 25,000	3	100,000
D* E†	..	..	..	..
F	5	20,000	3	100,000
G	5	20,000	2	100,000
H‡	5	20,000	2	100,000
I	5	30,000	2	150,000
J‖	4	20,000 10,000 10,000 10,000	3	50,000

* As in C but with instrumentation and prostatic massage after second injection.
† As in C but with urethral irrigations twice daily.
‡ With instrumentation and prostatic massage after second injection.
‖ Penicillin given on second day of 3-day course of sulphathiazole (20 g.).

Clinical cure signifies the absence of urethral discharge on inspection, a clear urine free from shreds, and the absence of gonococci and excessive pus cells from any early morning smear. A gentle rectal examination *without* prostatic massage was performed after clinical cure was established; and, if the patient's condition was satisfactory on examination next morning, he was discharged to duty the next day. The cases in the penicillin series have not all completed the final test made three months after leaving hospital. It is probable however that the majority of patients with a recurrence of symptoms would have been returned to us; consequently we feel that the assessment at the final test will not differ significantly from the results given in table II. All the men in the sulphathiazole series have completed final tests, and these results therefore represent a final assessment.

No complications arose after treatment, and there was complete failure in only 2 cases receiving penicillin (table II). Relapses were arbitrarily classified into early or late, depending on whether the recurrence of clinical signs manifested itself within or after the 28 days following treatment (Laird 1940). The presence or absence of gonococci in the relapse cases is indicated in table II.

Instrumentation and prostatic massage during the acute stage of urethritis are normally strongly contra-indicated. These unorthodox measures were first tested in the penicillin therapy of sulphonamide-resistant cases to promote drainage from closed foci, and gratifying results were achieved. Since relapse is sometimes due to the presence of closed foci of infection, a similar test was made in apparently uncomplicated cases (schedules D and H in the tables). The relapse-rate in these two series was not significantly reduced, but no detrimental effect was noted.

COMMENT

In general the response to penicillin was excellent. The best results followed five injections given two-hourly. No significant difference resulted from increasing the total dosage from 100,000 units (schedule G) to 150,000 (schedule I). Schedule G is now our routine treatment

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TABLE II—RESULTS OF TREATMENT

Treatment schedule (see table I)	No. of cases	Clinical cures	Time for clinical cure (days)	Time in hospital (days)	Complete failures	Early relapse		Late relapse		Total relapse and failures
						Gc +	Gc −	Gc +	Gc −	
A	50	39 (78%)	2·4	6·5	..	7	3	1	..	11 (22%)
B	50	40 (80%)	2·9	6·1	1 (2%)	9 (18%)	..	..	..	10 (20%)
C	53	45 (85%)	2·9	5·2	..	7	1	..	..	8 (15%)
D	52	48 (92%)	2·8	5·0	..	3	1	..	..	4 (8%)
E	51	43 (84%)	3·2	6·1	..	5	3	..	..	8 (16%)
F	52	50 (96%)	2·6	4·6	..	2	..	..	..	2 (4%)
G	66	65 (98·5%)	2·0	4·1	..	1	..	..	..	1 (1·5%)
H	49	48 (98%)	2·2	4·5	..	1	..	..	..	1 (2%)
I	52	51 (98%)	2·2	4·3	..	1	..	..	..	1 (2%)
J	53	49 (92%)	2·3	5·0	1	1	1	..	1	4 (8%)
Sulphathiazole Oct.–Dec. 1943	86	69 (80%)	4·5	7·7	13 (15%)	..	3	..	1	17 (20%)
Sulphathiazole Jan.–Mar. 1944	65	54 (83%)	3·4	6·5	6 (9%)	2	3	..	..	11 (17%)
Sulphathiazole Apl.–June, 1944	72	59 (82%)	3·2	5·5	10 (14%)	2	1	..	..	13 (18%)
Sulphathiazole July–Sept. 1944	99	81 (81·5%)	3·3	6·0	5 (5%)	8	3	2	..	18 (18·5%)
Sulphathiazole Oct.–Dec. 1944	86	72 (84%)	2·7	5·7	5 (6%)	6	2	1	..	14 (16%)

and continues to give excellent results, with a consequent saving of penicillin. The high rate of rapid clinical cure, the absence of toxic effects, and the short stay in hospital contribute to making penicillin the best routine treatment of gonorrhœa in Service personnel. It represents a definite advance on the results obtainable with sulphathiazole (see table II).

SUMMARY

An attempt to establish a standard treatment with penicillin for acute uncomplicated gonorrhœa in Service men is described.

The results obtained with ten different treatment schedules, involving 528 cases, are tabulated and compared with the results obtained with sulphathiazole in 408 cases.

Five injections at two-hourly intervals gave the best results, and no significant difference was noted when the total dosage was increased from 100,000 to 150,000 units.

The high rate of clinical cure, the short stay in hospital, and the absence of toxic effects justify the conclusion that penicillin is the best routine treatment for gonorrhœa in Service personnel.

REFERENCES

Laird, S. M. (1940) *Brit. med. J.* i, 967; (1941) *Lancet*, ii, 272; (1942) *Ibid*, i, 463.
Lancet Annotation (1945) ii, 212.

Preliminary Communication

THE ACTION OF "RELAXIN" IN THE MOUSE

IN 1926 Hisaw [1] stated that *relaxation*, as distinct from separation, of the symphysis pubis of the guineapig quickly followed the injection of pregnant-rabbit serum (P.R.S.). Later the active agent was demonstrated in a luteal extract which was free from the substances subsequently known as œstrogen and progesterone, though it was inactive in the absence of œstrogen.[2,3] The qualitative nature of the criterion, the fact that the related quantitative phenomenon of separation could be produced by œstrogen (and progesterone), and the revision in the 1930s of many ideas which accompanied purification of the ovarian hormones, tended to discredit the existence of relaxin. In 1944, however, a series of papers from Hisaw's laboratory appeared, re-establishing its claim to individuality.[4,5,6]

Meanwhile, it had become evident to one of us that the *separation* of the mouse symphysis in pregnancy, with the growth of a ligament between the bones, was quantitatively too extensive and too rapid to be explained by the separation which Gardner [7] obtained on injecting spayed mice for long periods with generous doses of œstrogen. If the latter were the active agent, then it seemed likely that in pregnancy a catalyst must also be present. Removal of the ovaries [8] prevented, but of the pituitary [9] did not prevent, the separation during pregnancy.

As opportunity offered, from 1939 onwards, batches of spayed mice were injected with 1 c.cm. daily of P.R.S., in addition to a basal, but itself ineffective, dose of œstrogen. After about a week pubic separations of 2 to 3 mm. were observed (negative results were obtained with non-pregnant-rabbit serum). During 1945 further experiments placed these findings on a firm basis, as follows:

(1) X-ray examination showed that enlargement of the pubic gap in normal pregnancy started between the 13th and 14th days, and proceeded thereafter at a rate of about 1 mm. per day for about 5 days.[10]

(2) In spayed mice, daily subcutaneous doses of from 1·6 to 25 μg. œstrone in oil for 10 days gave statistically indistinguishable results. In œstrone-treated spayed mice irrespective of dosage, the increase in pubic separation in mm. was 0·20 ± 0·14 (S.E. of mean of 39 observations). In spayed mice receiving in addition 0·1 c.cm. daily of P.R.S. from the 3rd day of œstrone injection onwards, the increase of separation in mm. in 10 days was 0·93 ± 0·52 (S.E. of mean of 17 observations). The difference between the means is significant. A photographic enlarger was used to measure the X-ray negatives.

(3) The experiment was prolonged in 18 of the mice to 16 days, when mice receiving 6·4 or 25 μg. œstrone alone had an increase in pubic separation in mm. of 0·36 ± 0·2 (S.E. of mean of 11 observations), while mice receiving 1·6 μg. œstrone + 0·1 c.cm. P.R.S. had an increase in the gap in mm. of 1·4 ± 0·6 (S.E. of mean of 7 observations). The difference between the means is again highly significant by Fisher's *t* test.

(4) Progesterone in doses up to 1 mg. per day did not enhance the action of œstrone in spayed mice, and when it was used to maintain pregnancy in mice spayed during gestation with or without added œstrone, the symphysis remained closed.

(5) Spayed œstrone-primed mice, after 8 daily injections of 0·2 c.cm. of an extract [11] of P.R.S. developed an average pubic gap in mm. of 4·33 ± 0·6 (S.E. of mean of 10 observations, thus approaching the normal rate of separation).

We conclude that pubic separation in the mouse can be actuated by the same means as relaxation in the

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guineapig, and that it may furnish a delicate objective test for relaxin which is a physiological entity.

Our experiments, the expenses of which were defrayed by the Medical Research Council, will later be published in detail. Our thanks are due to Prof. H. H. Stones of the Liverpool School of Dental Surgery for X-ray facilities.

KATHLEEN HALL, Ph.D. Wales
W. H. NEWTON, M.D. Manc., D.Sc. Lond.
University of Liverpool.

REFERENCES

1. Hisaw, F. L. (1926) *Proc. Soc. exp. Biol., N.Y.* **23**, 661.
2. Hisaw, F. L. (1929) *Physiol. Zoöl.* **2**, 59.
3. Fevold, H. L., Hisaw, F. L., Meyer, R. K. (1930) *Proc. Soc. exp. Biol., N.Y.* **27**, 604.
4. Abramowitz, A. A., Money, W. L., Zarrow, M. X., Talmage, R. V. N., Kleinholz, L. H., Hisaw, F. L. (1944) *Endocrinology*, **34**, 103.
5. Marder, S. N., Money, W. L. (1944) *Ibid*, p. 115.
6. Hisaw, F. L., Zarrow, M. X., Money, W. L., Talmage, R. V. N., Abramowitz, A. A. (1944) *Ibid*, p. 122.
7. Gardner, W. U. (1936) *Amer. J. Anat.* **59**, 459.
8. Newton, W. H., Lits, F. J. (1938) *Anat. Rec.* **72**, 333.
9. Newton, W. H., Beck, N. (1939) *J. Endocrinol.* **1**, 65.
10. Hall, K., Newton, W. H. (1946) *J. Physiol.* (in press).
11. Abramowitz, A. A., Hisaw, F. L., Kleinholz, L. H., Money, W. L., Talmage, R. V. N., Zarrow, M. X. (1942) *Anat. Rec.* **84**, 456.

Medical Societies

NORTH OF ENGLAND OBSTETRICAL AND GYNÆCOLOGICAL SOCIETY

AT a meeting of the society in Manchester on Nov. 16, 1945, a paper on

Fatal Air-embolism following Vaginal Insufflation

was read by Dr. C. H. WALSH. A primigravida, aged 17, was being treated with 'Picragol' insufflations for leucorrhœa at about the 30th week of pregnancy. The first insufflation produced no discomfort. The second, a week later, was performed by a nurse with the patient lying in the left lateral position. Six or seven squeezes of the bulb were made. In a few seconds the patient became cyanosed, fought for breath, and became unconscious, dying in four or five minutes. Autopsy revealed the uterus to be 30 to 31 weeks pregnant, and to contain a normally developed fœtus. The placenta was situated in the posterior upper segment and showed a small detachment at its lower border and stripping of the membranes down to the cervix, with a minute trace of picragol powder in a maternal sinus. The inferior vena cava was ballooned with air, and the right auricle was much dilated and contained frothy blood. No other abnormality was discovered. The immediate cause of death was pulmonary artery obstruction and right-sided heart failure due to air-embolism. Dr. Walsh pointed out that the insufflator delivers about 50 c.cm. of air and powder, and in the average vagina, if the rubber cone makes an air-tight connexion with the introitus, 6 or 7 squeezes will blow in some 350 c.cm. of air and powder, delivered at a pressure of at least 150 mm. Hg. Under these conditions even a small patent venule is capable of gobbling up air with fatal consequences. The forcing of air under pressure into any cavity in the body may cause sudden death from air-embolism. Pregnancy or a bleeding surface favours air entry. Dr. Walsh therefore suggested that vaginal insufflation is contra-indicated in pregnancy or in the presence of bleeding from the uterus, and that tubal insufflation should be discarded in favour of a 'Lipiodol' technique.

Stress Incontinence

Mr. PERCY MALPAS, in a paper on the cystometric and radiological aspects of stress incontinence, discussed the ways of observing the behaviour of the bladder under various conditions of artificial distension. The outstanding feature of the bladder behaviour under artificial as well as natural conditions is its complete and ready adaptation to all conditions of distension, so that its resting pressure remains constant whatever its volume, except during a short refractory phase at the beginning of filling and just before the limit of complete distension. This resting pressure is quite low but varies in different types of patient, and the variation might afford a method of measuring the essential vesical tone. Thus in early pregnancy the tone, as shown by a high resting pressure, is greater than in the non-pregnant woman. This, rather than any mechanical factor, appears to be the cause of the frequency of micturition in early pregnancy, and also seems to be a possible factor in the production of the hydro-ureter of pregnancy. In non-parous women the pressure is usually near to zero—never more than 10 cm. of water—and is no higher in patients with stress incontinence than in other women. This has some bearing on the operative treatment of stress incontinence. The repair required to produce continence need only be strong enough to withstand this low resting pressure, which is in no way comparable with the rise in pressure accompanying micturition. It might be argued that in the various straining efforts which cause stress incontinence the bladder pressure rises to a much greater height, but the evidence does not support this view; even with a paroxysm of coughing it is impossible to build up the intravesical pressure to more than 15 cm. of water. A single cough produces a small rise, but if the coughs are repeated quickly enough a summation effect of this degree may be produced. This observation confirms the view that the mechanism to maintain continence need only be strong enough to withstand a low pressure. No relation exists between the degree of distension of the bladder and the incidence of stress incontinence. The symptom is just as troublesome, sometimes more so, when the bladder is empty as at full distension, conforming with the clinical observation that the symptom is often troublesome soon after the bladder has been voluntarily emptied—in fact, owing to the presence of the refractory phase at the beginning of distension, it may be particularly troublesome then. As a minor way of combating the symptom it may be well to advise these patients to refrain from any sudden effort for a short period after micturition. In patients with stress incontinence the control of micturition itself is normal and they can stop the flow immediately they desire, an observation supporting the view that the lesion responsible for the stress incontinence is extrinsic to the bladder neck and the urethra. It is possible to divide cases of stress incontinence into two groups—one in which the jet escapes under pressure, and a second and smaller group in which the urine leaks on any sort of effort and not necessarily an effort raising the intra-abdominal pressure. The groups may be distinguished by the fact that in the first the ordinary methods of repair prove adequate; it is in the second group that more specialised methods may be required.

Mr. Malpas then discussed the radiological aspects of the problem, and stressed the point that a lateral cystogram gives much more information than an antero-posterior film, because the vesico-urethral junction is higher than the most dependent part of the bladder and cannot be seen except in a lateral view. He discussed the various methods of examining this junction by X rays. In choosing the radiopaque solution to be used, if changes in the contour of the bladder are to be seen a weaker solution of sodium iodide than is usually employed is preferable, so that the variations in the density of the shadow due to variations in the diameter of the bladder can be picked out. In the descent of the bladder on straining, which is noted in cases of cystocele and stress incontinence, the bladder appears to descend as a whole. The vesico-urethral junction is situated far more in the mid-pelvis than is commonly supposed. This anatomical fact has a bearing on the operative repair of these cases. It is important to avoid any operative procedure which will approximate the bladder neck to the back of the symphysis. In many cases in which a repair operation has failed to relieve stress incontinence it will be found that this has been done, and that the urethra and anterior vaginal walls are closely applied to the back of the symphysis and have lost their normal curve. The good results sometimes obtained by a Goebbel-Stoeckel-Aldridge fascial sling operation are probably due to the fact that the operation ensures an upward rather than a forward displacement, but Mr. Malpas was of the opinion that it was possible, with great care, to achieve this end by means of the more conventional techniques.

Finally, Mr. Malpas showed a series of lateral radiograms taken during pregnancy and labour, mainly illustrating the normal appearances and their variations from the non-pregnant condition, and the significance of an "abdominal" bladder during the first stage of

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labour. In most cases of trial labour in which an "abdominal" bladder can be seen during the first stage of labour—that is, in cases in which the bladder shadow is completely above the pelvic brim—a cæsarean section will be necessary. In a normal labour the elevation of the bladder into the abdomen occurs quite late in the second stage and is even then often incomplete in cases of easy labour. When the lateral radiogram is used to determine the course of a trial labour there is much to be said for combining it with a lateral cystogram.

Secondary Carcinoma of the Vulva

Prof. T. N. A. JEFFCOATE reported a case of carcinoma of the vulva secondary to a primary growth in the breast in a nulliparous widow, aged 65, who, when first seen in October, 1944, complained of a small swelling in the groin which she had had for six months. This had given rise to an occasional pricking sensation on walking. A little hæmaturia had been noted two months previously for two days. A radical mastectomy had been performed eight years before for carcinoma. The site of the scar showed no sign of recurrence either in the skin or axilla. The patient looked well; she was thin but did not show any obvious sign of loss of weight. Just lateral to the left pubic spine was a shallow ulcer about the size of a sixpence, with a serpiginous outline. Its base was rather hard but freely mobile on deep structures, with its edges slightly raised. It had the appearance of umbilication. There was no enlargement of the glands in the groin. Beneath the skin of the left labium majus, and just anterior to the position of Bartholin's gland, a nodule about the size of a pea could be felt. This was also mobile on deep structures, but was fixed to skin. The Wassermann reaction was negative. A local excision of the ulcer and nodule was performed in view of the possibility of its being an intradermal carcinoma. Cystoscopy revealed an area on the right bladder wall, the appearance being identical with that of the ulcer, about the same size and umbilicated. A chest radiogram showed the right lower lobe to be collapsed. Histological examination showed that both lesions were probably metastatic growths, the primary being the previous breast carcinoma. No further treatment was possible and the patient was kept under observation until she died in 1945. The autopsy showed widespread small metastatic growths, all secondary to the old breast carcinoma. Their distribution was bizarre—parietal and visceral peritoneum, muscle of stomach, the pancreas and even the appendix, both adrenals, the sternum, ribs, and vertebræ, both submaxillary glands, both ovaries, and left fallopian tube. The secondaries seem to have appeared first in the mediastinal glands and then been disseminated in the blood-stream. The extraordinary features were that the vulva was the site of the first metastasis to attract attention, and that the patient's deterioration was so slow in view of the blood-borne spread.

Reviews of Books

Duodenal and Jejunal Peptic Ulcer: Technique of Resection

RUDOLF NISSEN, M.D., surgeon, Jewish Hospital, Brooklyn, formerly professor of surgery, Istanbul, and associate professor of surgery, Berlin. (London: Heinemann. Pp. 143. 21*s*.)

As the title indicates, this book is intended for surgeons who propose to specialise in gastric work. It gives much careful description and illustration to technical details and difficulties that arise in the course of a partial gastrectomy—e.g., in closure of the duodenal stump. In so doing it fills a notable gap. The British reader however will reflect that not all duodenal ulcers require partial gastrectomy, and will regret the scant attention paid to gastro-enterostomy, which retains its place as a sound and safe procedure in properly selected cases, especially in the hands of those who operate infrequently for this condition. Many gastric surgeons too will doubt the wisdom of Dr. Nissen's practice of excising a duodenal ulcer almost at any cost, since it can with confidence be left to heal in an amputated duodenal stump completely cut off from gastric juice. He quotes largely from German and American sources in support of his views. To disagree does not detract from the value of his book as a description of operative technique, and his advice and experience will be helpful to abdominal surgeons.

Die intravitale Knochenmarksuntersuchung

Dr. Med. STEFAN J. LEITNER. (Basle: Schwabe. Pp. 386. Sw.Fr. 36.)

THIS modern Swiss textbook deals with the results of sternal bone-marrow puncture and their application to hæmatology. After a brief historical introduction, and a somewhat inadequate description of technique, there is a short "general" section. In this the scheme of blood-cell development is orthodox; Dr. Leitner, as might be expected of a fellow-countryman of Naegeli, is clear on the difference between megaloblast and normoblast; he follows Moeschlin in giving a separate line of development to the plasma cells; and he provides some good illustrations and explanations of atypical cell forms. The bulk of the book is formed by the "special section," describing sternal-marrow findings in particular diseases. The descriptions follow orthodox European lines; in the German fashion, they are minutely detailed with exhaustive references—and quite unreadable. Most of the illustrations are black-and-white reproductions of photomicrographs at 1:1000 to 1:1500 magnifications and many suffer from poor definition. Study of the bibliography shows how far the Swiss have been cut off from the West during the war; there are few references to American literature after 1939 and almost no British quotations. The numerous references to work in Germany and Italy suggest that no notable advances in hæmatology were made there during the war.

The book is well bound and printed on better paper than British textbooks can secure.

Ophthalmia Neonatorum

ARNOLD SORSBY, M.D. Leeds, F.R.C.S., research professor in ophthalmology, Royal College of Surgeons of England and Royal Eye Hospital. (London: Hamish Hamilton. Pp. 66. 7*s*. 6*d*.)

Professor Sorsby's monograph describes the incidence and effects of ophthalmia neonatorum since notification became compulsory in 1914. He shows that in not more than a quarter of the patients is the gonococcus the infecting organism, and that while the incidence has not much decreased, the end-results have improved so greatly that in the three years 1941–43 not a single case of total blindness from this cause was reported; of nearly 3000 notifications for the same period only 2 babies had impaired vision. Since the beginning of the war the hospital to which the author is attached has received all children suffering from this infection in the London area, and the second half of his monograph gives a comparison of results of treatment by different methods. This shows that local instillation of penicillin has proved so effective that all other methods, including sulphonamide therapy, are now obsolete. Indeed with penicillin the cure is sometimes only a matter of hours, and it seems hardly possible to improve on the speed and effectiveness of the present treatment, though much remains to be done in removing infection from the mother during pregnancy.

Arteriosclerosis

JÓHANNES BJØRNSSON, translated by ROBERT FRASER. (Copenhagen: Munksgaard. Pp. 249.)

THIS carefully documented "chemical and statistical study" may add little to our knowledge of an abstruse subject, but it is a valuable corrective to vague obiter dicta uttered by many people in many countries at many times. Dr. Bjørnsson set out to test a clinical impression that arteriosclerotic conditions are less common in Iceland than in Denmark; he has ended by showing how little basis there is for many of the ex-cathedra statements on their geographical and nosological distribution. His monograph is divided into three parts: the first is a critical review of the literature; the second describes a quantitative chemical analysis of the aorta in a series of cases, and attempts to correlate the chemical and anatomical findings; while the third compares the findings in series from Iceland, Copenhagen, and Vienna. The author is able to draw few conclusions, but his work deserves careful study. Incidentally, it provides an impressive argument for setting up international standards in clinical and pathological nomenclature.

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THE LANCET

LONDON: SATURDAY, JANUARY 12, 1946

Chemotherapy in Tuberculosis

THE successful chemotherapy of many bacterial infections does not yet extend to tuberculosis, although the search for an effective substance is being feverishly pursued in most countries of the world. FLOREY [1] gives a timely warning when he says, "At the moment much attention is being applied to the possibility of discovering an antibiotic which will be effective against tuberculosis. That such a possibility exists no one will deny, but the urge to fame is such that I greatly fear there will be many unreliable and premature publications on this subject."

In human tuberculosis the investigation of possible chemotherapeutic agents presents some peculiar difficulties. For example, in-vitro activity often bears little relationship to in-vivo activity; thus sulphathiazole was found by BALLON and GUERNON [2] to exert a pronounced inhibitory effect on the growth of human tubercle bacilli on solid media, but the same workers [3] and others [4] could demonstrate only a doubtful effect in tuberculous guineapigs. Another difficulty is the difference between tuberculosis in laboratory animals and in man. Tuberculosis in the guineapig is a relatively simple progressive disease with neither native nor acquired resistance apparently playing any part. Tuberculosis in man is often a most complex disease with a clinical and pathological picture very different from that in the guineapig. There may well be a fundamental difference in the permeability of the tubercle in man and in animals. RICH [5] argues that the tubercle must be permeable to substances in solution, and quotes experimental evidence that foreign substances injected intravenously penetrate to the centre of the tubercle. LEWIS [6] and MENKIN and MENKIN,[7] among others, used rabbits for this experimental work, but TYTLER [8] points out that in man the lesions are often largely necrotic and non-vascular compared with the relatively cellular and vascular lesions in animals. He suggests that it would be difficult for any chemical agent to penetrate and sterilise the necrotic lesions of man.

The difference between the effects of chemotherapeutic substances on the tuberculosis of animals and of man is well illustrated by the results obtained with sulphone compounds. The first of these to receive attention was promin. FELDMAN and his colleagues [9] published reports, later confirmed by other workers, showing that promin significantly retards the progress of tuberculosis in the guineapig. The drug, however, does not seem to kill the tubercle bacillus and has a considerable toxic effect, mainly on the blood-forming organs. The results with promin in human cases of tuberculosis are disappointing. TYTLER,[8] after reviewing reports on the administration of promin to several hundred patients, concludes that it is not likely to have curative effects in tuberculosis comparable to those of the sulphonamides in acute infections or of the arsenicals in syphilis. Two other sulphone compounds have been used in the treatment of tuberculosis in guineapigs and in man. Diazone was tried in experimental tuberculosis by CALLOMON,[10] who reported a considerable retardation of the disease, but in man the effects of the drug are at least questionable. BENSON and GOODMAN [11] gave diazone to twenty-two patients for 120–160 days and only four may possibly have benefited from the drug; two patients died during the treatment and many toxic symptoms were seen in others. FELDMAN and his co-workers [12] found that promizole has a therapeutic effect on experimental tuberculosis comparable with that of promin, but in half the dosage. The toxic effects were less than those of promin, but FELDMAN concludes that promizole does not meet all the critical requirements for the perfect tuberculo-chemotherapeutic agent.

A substance of an entirely different nature—streptomycin, an antibiotic obtained from an actinomyces found in soil—was described by SCHATZ and WAKSMAN [13] as having a pronounced bacteriostatic and bactericidal action in vitro against a human strain of tubercle bacillus. With this substance FELDMAN and his colleagues [14] have reported results in experimental tuberculosis in guineapigs which are strikingly better than any previously recorded with other drugs. The toxicity for guineapigs is very low, so low that a cytotoxicity test showed approximately equal results with streptomycin and penicillin. Treatment of the infected guineapigs was begun 48 days after infection and continued for 166 days. At the end of this time thirteen out of twenty-five treated guineapigs showed no macroscopic or microscopic tuberculosis; in eight of these no tubercle bacilli were isolated either in culture or after inoculation. Sixteen out of twenty-four of the control untreated guineapigs had died with extensive tuberculosis before the end of the experiment. A remarkable feature of the experiment was the result of tuberculin testing. Before treatment was started all the guineapigs gave a positive reaction to tuberculin. When the experiment ended all the untreated controls still surviving remained tuberculin-positive, whereas nine of the treated animals had become tuberculin-negative. FELDMAN is rightly cautious about translating the experimental results into terms applicable to human tuberculosis. He again emphasises the difference between tuberculosis in man and in guineapigs and deprecates any effort to predict what streptomycin may accomplish for human tuberculosis. "Serious harm," he says, "may result

1. Florey, H. W. *Brit. med. J.* 1945, ii, 635.
2. Ballon, H. C., Guernon, A. *Amer. Rev. Tuberc.* 1942, **45**, 212.
3. Ballon, H. C., Guernon, A., Simon, M. A. *Ibid*, 1942, **45**, 217.
4. Smith, M. I., Emmart, E. W., Westfall, B. B. *J. Pharmacol.* 1942, **74**, 163.
5. Rich, A. R. The Pathogenesis of Tuberculosis, Baltimore, 1945.
6. Lewis, P. A. *Arch. intern. Med.* 1912, **10**, 68.
7. Menkin, V., Menkin, M. F. *J. exp. Med.* 1931, **53**, 919.
8. Tytler, W. H. *Tubercle*, 1945, **26**, 23.
9. Feldman, W. H., Hinshaw, H. C., Moses, H. E. *Proc. Mayo Clin.* 1940, **15**, 695; *Amer. Rev. Tuberc.*, 1942, **45**, 303. Feldman, W. H., Mann, F. C., Hinshaw, H. C. *Ibid*, 1942, **46**, 187. Feldman, W. H., Hinshaw, H. C. *Ibid*, 1943, **48**, 256.
10. Callomon, F. F. T. *Ibid*, 1943, **47**, 97.
11. Benson, L., Goodman, L. *Ibid*, 1945, **51**, 463.
12. Feldman, W. H., Hinshaw, H. C., Mann, F. C. *Proc. Mayo Clin.* 1944, **19**, 25.
13. Schatz, A., Waksman, S. A. *Proc. Soc. exp. Biol., N.Y.* 1944, **57**, 244.
14. Feldman, W. H., Hinshaw, H. C., Mann, F. C. *Amer. Rev. Tuberc.* 1945, **52**, 269.

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to patients who refuse such proved remedies as sanatorium care and collapse therapy in the remote hope that a powerful chemotherapeutic remedy is imminent."

It is now clear that it is possible to exert a profound effect on experimental tuberculosis by chemotherapy. Whether the discovery of the effective chemotherapeutic agent for human tuberculosis comes soon or is long delayed, it is reasonable to believe that it will come. There may well be disappointments ahead—perhaps because of unexpected toxic effects arising from the long-continued administration of a potent drug in so chronic a disease as human tuberculosis. But considering the triumphs of the last few years it is hard to imagine that they will withstand an integrated attack by scientists and clinicians.

Penicillin for Gonorrhœa

ONE of the legacies the war has left to the much afflicted continent of Europe is a serious increase in venereal disease, resulting from the abnormal social conditions which so long prevailed, and to a lesser extent from the shortage of effective drugs. To UNRRA's health division for the European region this is a major concern; and in approaching the problem of the most effective use of the new remedy now available it has wisely decided to take stock. In a recent UNRRA bulletin[1] the published work on the treatment of gonorrhœa with penicillin has been summarised fully from the first reports in 1943 until the present time. Analysis of twenty-nine reports on the treatment of gonorrhœa in the male shows that in 94·2% of 12,403 cases success followed one course of penicillin injections. Three-quarters of the failures responded to a second series of injections, so the cures claimed for one or two courses of this treatment reached the remarkable total of 98·2%. There is evidence, too, that some of the small remainder responded to a third or even a fourth course. There are eight reports relating to gonorrhœa in the female, giving the results in 830 cases, of which 95% responded to one course and all but 2 of those re-treated responded to a second course. In most cases the effect of penicillin was dramatic, with prompt relief of symptoms and disappearance of discharge in 24–48 hours, although a thin mucoid abacterial discharge sometimes persisted for a week or more without affecting final recovery. The time taken for gonococci to disappear from discharges varied, but in almost all cases it was less than twenty-four hours.

The search for optimum dosage and duration of administration of the drug has led to wide variation in total dosage, individual dose, and interval between injections. Total dosage has ranged from 25,000 units to more than 300,000, and individual doses from 10,000 to 100,000 units given in 1 to 16 injections at intervals of one to three hours. In the large majority of cases injections have been given intramuscularly. The duration of treatment has varied from the time required for a single injection to forty-eight hours. Single injections of an aqueous solution of sodium penicillin containing 50,000–100,000 units were often ineffective, whereas a course of injections was usually effective if the total dosage was not too small and the period of administration not too short. To obtain a high percentage of good primary results it was necessary to use a total dose of 75,000 units or more. Provided the total was not less than 100,000 units there was no disadvantage in shortening the interval between injections to two hours and limiting the number of injections to 5 or even 3. Failures of treatment were ascribed to three causes. Some were due to insufficient dosage in the first instance; but fortunately most of these responded at the second attempt, in which the usual practice was to increase the dose. A few failures may have been due to "penicillin resistance," although detailed evidence on this point is lacking. Finally, failures resulted from the presence of complications of the disease for which even large doses of penicillin and several courses of treatment were sometimes ineffective. As far as the evidence went it suggested that penicillin is more effective in prostatitis than in epididymitis, which is the direct contrary of common experience with the sulphonamides. For both these complications, and for periurethral abscess, very large doses might be required—more than a million units in some cases. The most resistant complication appeared to be gonococcal arthritis, in which failures were common even after very large doses and protracted treatment. An interesting point was that the development of complications, particularly epididymitis, was not unknown during or subsequent to the administration of penicillin. The evidence on the treatment of pelvic complications in women was slight, but there were some successes.

Various methods of delaying the absorption or excretion of penicillin have been tried in order to obtain a satisfactory proportion of successes with a single injection.[2] Those which delay excretion are still at the experimental stage and take the form of simultaneous intravenous injections of penicillin solution and substances which delay urinary excretion, such as diodone[3] and *para*-aminohippuric acid.[4] Absorption of penicillin has been delayed successfully by the application of an ice-bag to the site of injection for two hours before and twelve hours after the administration of penicillin,[5] and by the more practical method of ROMANSKY and RITTMAN[6] who incorporated 100,000 units of calcium penicillin in 1 c.cm. of peanut oil containing 4% of beeswax. After intramuscular injection this preparation maintained a bacteriostatic level of penicillin in the blood-stream for 7½ hours. Clinical trials have shown this method to be reliable, and the results were still better when the dose was increased to 150,000 units; there were no local ill effects, but a needle of large gauge (19–20) was required for the injection.

In this issue LAIRD and FIELDSEND describe their results with penicillin in 528 cases of acute uncomplicated gonorrhœa in Service men, using, for the purposes of investigation, ten different schedules of treatment. Their proportion of successes was similar to that generally claimed and was an appreciable improvement on results with sulphathiazole in 408 cases. Best results were obtained by giving five intramuscular injections at intervals of two hours, and

1. *Bulletin of Communicable Diseases*, 1945, vol. 3, no. 11, p. 47.

2. Leading article, *Lancet*, 1945, ii, 601.
3. Rammelkamp, C. H., Bradley, S. E. *Proc. Soc. exp. Biol., N.Y.* 1943, **53**, 30.
4. Beyer, K. H., Woodward, R., Peters, L. *Science*, 1944, **100**, 107.
5. Trumper, M., Hutter, A. M. *Ibid*, p. 432.
6. Romansky, M. J., Rittman, G. E. *Bull. U.S. Army Med. Dept.* 1944, October, p. 43.

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there seemed to be no advantage in giving 150,000 units rather than 100,000. The proportion of failures rose sharply if the number of injections was reduced or if the interval between injections was increased to more than three hours. Most investigations of this kind suffer from the difficulty of ensuring an adequate period of observation and testing for the patient who has recovered from his symptoms. In the studies reviewed by UNRRA exhaustive tests, by smears and cultures of urethral discharge and prostatic secretion, seem to have been applied during the period of observation; but this period was in most cases limited to three weeks, which is insufficient by the standards which have been regarded as essential in this country. The statement that bacteriological relapses are extremely unlikely if findings remain negative for three weeks cannot be accepted, for experience has shown that delayed relapses are not very uncommon. Unfortunately such relapses are sometimes called "re-infections"; and in other cases the delayed indications of residual infection are not such as to attract the patient's attention. In assessing the cure of gonorrhœa the lapse of time is not less important than the use of bacteriological tests, and the occurrence of "re-infection" in less than three months should raise the serious suspicion that the case is really one of clinical and bacteriological relapse. Even if such a patient admits further sexual intercourse re-infection is not certain, because intercourse is apt to provoke relapse when latent infection is present. The results of LAIRD and FIELDSEND are to some extent open to similar criticism, for their patients were retained in hospital for an average of only 4·1–6·5 days, according to the group, and all did not complete final tests three months after leaving hospital. In addition to a small proportion of cases with short-term relapse there were two instances in which relapse was recognised a month or more after apparent cure. In one of these cases gonococci was present in the urethral secretion. There is a strong case for a study which will follow in detail the subsequent history and condition of some of the patients treated with penicillin. Potent as it is in the treatment of gonorrhœa, penicillin may be a two-edged weapon if in some cases it proves to be a short cut to latency.

Too Many or Too Few?

THERE is certainly no lack of new books on the population question. At least six have lately appeared,[1] together with a respectable list of pamphlets and articles. Most people therefore are now aware that since the 1870s the birth-rate has been more than halved. Until then, married women, on the average, had more than five children before the end of their child-bearing period, whereas by the 1930s the number was down to about two. An average family of two makes no allowance for those who die early in life and for those who do not marry. If people go on having families no larger than this, each generation will be succeeded by a generation smaller in numbers. In the ten years 1900–09 the average number of children born each year in Britain was 1,064,000. In each decade thereafter the number fell, and by 1930–39 it was only 701,000.

This fall in births is fundamentally changing the age structure of the population. Each year since the end of the first world war Britain has contained 100,000 fewer young people aged under twenty. Meanwhile the number and proportion of old people continues to rise. By 1970 we may have 5–6 million more old-age pensioners than in 1939. These facts are clearly set out in a broadsheet by P.E.P.,[2] which warns us that in less than a hundred years the population of England and Wales may fall from around 42 to 14 millions. In a second broadsheet[3] the causes of this retreat from parenthood are clearly and impartially analysed.

> "Voluntary parenthood," it is said, "is an innovation which is transforming population problems. Western civilisation is entering upon a new phase of social development in which replacement of numbers will depend upon the production of *wanted* children. Today, to a growing extent, people have children because they want them, or not at all. All the difficulties, real or imaginary, all the fears, rational and senseless, which have always beset child-bearing and rearing, have today, because parenthood is voluntary, been converted into obstacles to child-bearing. The new freedom of parenthood in advanced societies marks the end of the epoch of automatic replacement of human numbers. Henceforth replacement will depend upon the strength of the desire for children in the community and the extent to which that desire is not thwarted by adverse circumstances."

The unexpected—and so far unexplained—rise in the birth-rate in 1942–44 seems to have been a temporary phenomenon. Already the rate has begun to decline again. Scotland, which led the upward spurt at the end of 1941, has just announced a record low rate for any third quarter of the year.[4] It appears, therefore, that no forces, material or spiritual, have been or are at work which may be expected to counteract those operative for the past seventy years. "I see a Britain and a western Europe," said one historian (arguing from the past through the present to the future), "with populations falling rather sharply in the fifties and the sixties of this century."[5]

To some of us, after the turmoil of the last thirty years, there is something attractive in the idea of the declining populations of western Europe cultivating their little gardens, their one or two children, and their souls in peace. To many who live in London and the crowded cities of Britain, the thought of more elbow-room and a slackening of the competitive scramble for jobs, money, and enjoyment, is viewed with relish rather than alarm. But the issues are not so simple as this. It would be easy to make out a very strong case for a population of (say) 30 million, providing it was properly balanced between youth and old age and that it could be stabilised around this figure and in the right proportions. But we are here dealing with human beings. We cannot dictate to parents. We cannot plan reproductive behaviour. Even if we could, we should still not escape the manifold consequences that are bound to arise in the period of adjusting to a smaller population—and that is the really unpleasant part of the business. Moreover, as the decline sets in it will tend to gather momentum

1. Rebuilding Family Life in the Post-War World (Sir Arthur MacNalty, Sir John Orr, R. M. Titmuss, and others); Nation and Family (Alva Myrdal); Population of Great Britain (M. Abrams); Britain and Her Birth-rate (Mass-Observation); Population and the People (Fabian Society); Race Suicide (G. F. McCleary).

2. Vital Statistics. Broadsheet no. 241, Nov. 9, 1945.
3. Retreat from Parenthood. Broadsheet no. 242, Dec. 7, 1945.
4. Registrar-General for Scotland: Quarterly Return, Sept. 30, 1945.
5. Clapham, J. H. The Historian Looks Forward. Barnett House Papers, no. 25, June, 1942.

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from the social and economic forces that are loosed. The longer it continues the harder it will be to arrest.

Hence we must not confuse the problem of overgrown, crowded, and unplanned cities with the problem of the birth-rate. It is academic to talk about an ideal population size for Britain. The choice that lies before us is broadly this. We can ignore the situation and allow the birth-rate to continue on its downward course: in which case, as the P.E.P. broadsheet explains, we are likely to be confronted with some very formidable difficulties as the population steadily ages and diminishes to around 30 million by the end of the century. Or we can, by attempting to remove all the handicaps and barriers that today surround marriage and parenthood, hope to stabilise the size of our population at about the present figure. The possibility of any significant increase in population can be ruled out. It has taken seventy years for the average number of children per family to fall from five to two, and it would probably take twice as long to raise it even from two to four.

Annotations

A WEAPON UNUSED

CAN micro-organisms or their products be employed effectively in warfare? This question has been repeatedly asked, and bacteriologists have offered widely different replies. But those in the best position to give a confident answer have generally been the most reticent about disclosing even their interest in the subject—far less their opinions.

Information about work on biological warfare (B.W.) by the Allies during the past few years has been simultaneously released in London [1] and Washington, and we are told on the best authority that "a considerable amount of ground has been covered, and as a result we are now in a position to affirm that B.W. is a potential danger to an unprepared population." We are warned that "the metes and bounds of this type of warfare have by no means been completely measured" and we are assured that the Allied scientists who studied all aspects of B.W. had outstripped their rivals in enemy countries. Certainly their efforts lifted us out of the category of "an unprepared population," and the vigilance needed to detect at once any unusual outbreaks of disease, such as might be produced by the enemy's resorting to biological warfare, was faithfully maintained by bacteriologists throughout the country and in the Services. A wholly beneficial aspect of this activity was the stimulus it gave to development and extension of the Emergency Public Health Laboratory Service, which has already added much to our knowledge of the spread and prevention of disease in the community at large. But benefits accrued also from the studies on biological agents as weapons of war, and we are glad to learn that these will now be made known in appropriate publications. An impressive outline is given of the more important accomplishments. Among others, these are said to include: development of methods for mass production of micro-organisms and their products; development of methods for the rapid and accurate detection of minute quantities of disease-producing agents; production and isolation for the first time of a crystalline bacterial toxin and a more highly purified toxoid; significant contributions to knowledge of the control of airborne disease-producing agents; important advances in treatment and prevention of certain infectious diseases; information on the effects of more than 1000 different chemical agents on living plants; and studies of the production and control of certain diseases of plants. We look forward to having the fullest possible details in due course. Meanwhile this summary of rapid progress provides at least evidence that research work does not necessarily languish when it is efficiently organised, equipped, and financed; and we can congratulate the anonymous scientists that the knowledge they have gained will be used for and not against the human race.

1. From the office of the Minister of Defence. See daily newspapers, Jan. 4, 1946.

HEALTH UNITS IN THE TROPICS

ADDRESSING the Royal Society of Arts on Nov. 20, Dr. George Macdonald, director of the Ross Institute of Tropical Hygiene, referred to the health units which have been a feature of the public-health service of Ceylon since 1926. As described by Jacocks [1] and by Chellappah and Jacocks,[2] their purpose is to promote good health and sanitary efficiency in rural areas. They undertake the usual duties of a public-health department in a tropical country, including health education, general sanitation, collection of vital statistics, study and control of preventable disease, vaccination, maternity and infant welfare, and school inspections. They make surveys in connexion with malaria, hookworm infestation, and other diseases, and the staffs gain intimate knowledge of the people by visiting their homes. They arrange for the treatment of persons with tuberculosis and leprosy, and keep contacts under observation. Each unit maintains a small laboratory. For a population of 40,000, the staff consists of 1 medical officer of health, 5 sanitary inspectors, 5 public-health nurses, 10 midwives, 1 clerk, and 2 subordinates. The nurses, midwives, and inspectors are assigned their own areas, which they should know thoroughly and in detail. Emphasis is laid on gaining the confidence of the people, and on free discussion by the staff at weekly meetings.

Apart from treatment for hookworm infestation and for the minor ailments discovered at school inspections and maternity clinics, the Ceylon units do not undertake curative work, though they ensure that the sick are directed to the hospitals. In this matter they differ from the units started by Balfour Kirk [3] in Mauritius. In the proposals he made in 1927, Kirk argued that the best person to instruct the rural peasant of Mauritius in the principles of prevention of disease is the person who attends him when he is ill, and that to divorce preventive and curative medicine, in these circumstances, would be a mistake. The units were therefore organised around the district hospitals, and each included up to 5 satellite health centres, from which a sanitary inspector, a health visitor, a midwife, and a dispenser carried out the duties for which they had been trained, including treatment of such diseases as were appropriate to their capacities. Similar reasoning led Kauntze [4] to enlarge the scope of the work of medical officers in Uganda, so that they should not concern themselves solely with curative medicine, but should develop rural sanitation. He held that they were particularly well placed to do this because by their curative work they had secured the confidence of the people. This development would be made through the sub-dispensaries. Hooper and Loewenthal [5] have given an account of this system as seen in the Teso district of Uganda.

Kark and Kark [6] in Southern Natal have gone further. They agree that curative and preventive medicine should not be separated, but they insist that the logical duty of the staff of a health unit is to study the whole social and economic life of the people and gradually to

1. Jacocks, W. P. *Indian med. Gaz.* 1933, **68**, 332.
2. Chellappah, S. F., Jacocks, W. P. A Guide to Health Unit Procedure in Ceylon, Colombo, 1937.
3. Kirk, J. B. *Trop. Dis. Bull.* 1937, **34**, 89.
4. Kauntze, W. H. Uganda Protectorate: Ann. Med. and Sanitary Rep. for 1933. Entebbe, 1934. p. 5.
5. Hooper, R. C. D., Loewenthal, L. J. A. *Ann. trop. Med. Parasit.* 1936, **30**, 17.
6. Kark, S. L., Kark, E. *Clin. Proc., Cape Town*, 1945, **4**, 284.

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change those habits that are inimical to health. By frequent house visits they know not only the health and economic situation, but also the personal characters and relationships of some 5000 people, and have recognised the great difficulties placed in the way of progress by tribal beliefs in witchcraft, by ignorance, and by the basic disabilities of undernutrition, disease, and alcoholism. They are working towards the root causes of some of these, which are social and political no less than economic, and they combine closely with the agricultural and education authorities to educate the people to a better life. In this work, therefore, they are practising social medicine in a form suitable to the people with whom they deal. Their work is favoured by the government, and other units with a like programme have been instituted.

The use of health units is therefore fairly widespread, and is destined to become more so in tropical countries. It was favoured by the League of Nations in 1931; organisations not very different have been instituted in Malaya; the great Foréami service of the Belgian Congo may be regarded as a health unit writ large [7]; and the system has been widely adopted in the West Indies.[8] For the backward peoples, there is growing up a great movement for the improvement of the lot of the rural peasant, and in this movement the health unit is likely to be predominant. Besides attending to purely medical problems, it will be the duty of those who control such units to urge that the disabilities due to economic causes are removed by government action.

GRAM-POSITIVE

THE Gram stain was originally described in 1884 as an empirical means of distinguishing bacteria in tissues. The finding that most bacteria treated with a basic dye of the triphenylmethane group and with iodine reacted in one of two ways on washing with a neutral decoloriser was of major importance to systematic bacteriology. The real significance of this grouping of bacteria is only now beginning to be realised, for the behaviour towards "gram" is apparently correlated with a variety of biological and chemical differences. One of these differences—the response to chemotherapeutic agents—has forcibly impressed itself on clinicians. Effective chemotherapeutic substances such as the flavines, the antiseptic detergents, the sulphonamides, and the new antibiotics deal convincingly with gram-positive organisms but leave gram-negative bacilli comparatively unscathed. Gonococci and meningococci are apparent exceptions to the rule, but there may be doubt about the depth of their conversion to the gram-negative state. The fact that most toxic agents exhibit a selective activity against either gram-positive or gram-negative cells is only one of the more obvious reasons why thorough study of the nature of the gram reaction is of fundamental importance.

Already something is known about the comparative acid-base properties of gram-positive and gram-negative species, about the effect of the integrity of the cell on the reaction, and about differences in permeability between the two groups. It seems fairly certain that gram-positive organisms contain in the surface layer a material which is responsible for the staining reaction. The outer gram-positive layer can be stripped off many bacteria with bile-salts, and the extract so obtained can be made to re-clothe the gram-negative skeleton.[9] The active principle in such extracts has been shown to be magnesium ribonucleate, and organisms rendered gram-negative can be returned to the gram-positive state by placing them in a neutral solution of the magnesium salt of pure yeast nucleic acid. Organisms normally gram-negative resist such change of suit. Further confirmation of the importance of the protein ribonucleate complex is found in the fact that the enzyme ribonuclease can change many of the pathogenic cocci and clostridia from the positive to the negative state. This change takes place only with dead organisms.[10]

The Birmingham workers[11] have recently extracted the gram-positive complex from various organisms and they consider that the protein constituent in the nucleoprotein is of a novel type which differs from all known histones and protamines. They were able to dissociate the protein from the nucleic acid and to obtain both constituents in a reasonable degree of purity. Neither protein nor nucleic acid alone could be stained by Gram's stain, but on re-forming the complex it again stained strongly gram-positive. It is evident that in the gram-positive complex the linkage of the protein with ribonucleic acid is not simple. Sulphydryl groups and magnesium appear to play an important but as yet undetermined part. The mechanism of the gram stain and of the different susceptibilities of organisms to various antiseptics and antibiotics depends on a fuller understanding of the nature, distribution, and properties of the substances which make up the bacterial cell.

ELEANOR RATHBONE

IN *The Case for Family Allowances* Miss Rathbone said that men were usually credited with a keener sense of justice than women; yet women, she found, were better able to appreciate the justice of the arguments for recognising and supporting the work done by the mother of a family. It is largely because she was herself just, constant, and able, that family allowances are now on the statute-book, and that a House of Commons composed almost entirely of men insisted, against the then Government, that the allowances should be paid to the mother rather than the father. To review Miss Rathbone's career at length would be out of place here; but it is appropriate to recall that she always worked for those reforms which made for better health and a better life for the people of our country. She had the advantages of a sound education, she came of an influential Liverpool family, and she had the natural gifts of a strong intellect and a telling personality; she does not seem to have wasted any of the opportunities this combination gave her. On leaving Oxford she began an inquiry into dock labour designed to abolish the casual system. She helped to found the university department of social science at Liverpool, and lectured there. Her belief in the equality of the sexes, in the sense that they have each something to contribute to the study of our common well-being, naturally led her to work hard for women's suffrage: though, being inclined towards orthodox rather than revolutionary methods, she never became militant. In 1924 her studies of the economic life of the poor household were published in *The Disinherited Family*. As president of the National Union of Societies for Equal Citizenship she worked for women's pensions, and in 1934 she wrote a book on India, emphasising the ill effects of child marriage on both mothers and children. In the days of unemployment she was one of the founders of the Children's Nutrition Council, and she did her utmost for child refugees from Spain and other countries. Mr. A. J. Cummings in the *News-Chronicle* recalls her remark that if women hoped to press any reform to the point of achievement they must combine the methods of the giant Sisyphus, King Bruce's spider, the Ancient Mariner, and the importunate widow. Entry to Parliament in 1929 enabled her to use her considerable gifts in these rôles to forward the causes in which her interests were so deeply engaged. It was characteristic that at the

7. Trolli, G. *Brux. med.* 1939, 20, 147, 217, 272, 324.
8. Stockdale, F. Development and Welfare in the West Indies 1943–44, Colonial No. 189. London, 1945, p. 53.
9. Henry, H., Stacey, M. *Nature, Lond.* 1943, 151, 671.
10. Dubos, R. J. *Science*, 1937, 85, 549. Dubos, R. J., MacLeod, C. M. *J. exp. Med.* 1938, 67, 791.
11. Henry, H., Stacey, M., Teece, E. G. *Nature, Lond.* 1945, 155, 720.

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present time she should have been concerned chiefly for those who are going hungry in Europe this winter. In a letter to the *Times* of Jan. 5, Mr. Victor Gollancz tells that on the morning of the day she died she was drafting a letter to the 60,000 people who had written offering to give up some of their rations to relieve Europe, in which she asked them to send a contribution to the Food Relief Fund, c/o Council of British Societies for Relief Abroad, at 75, Victoria Street, London, S.W.1, as the best way of achieving their wish. Mr. Gollancz suggests that contributions might be sent to this cause as a tribute to Miss Rathbone—the only sort of tribute she would have wished. A generous response would be a fitting memorial to a great altruist.

MEDICINE IN GERMANY

GERMAN medicine, which once rivalled that of any European country, has fallen into sad disrepute. The decline dates from 1933, and most of its causes apply equally to other sciences and arts. The first, and most important, is the shortage of properly qualified teachers, owing to mass expulsion from the universities on racial or political grounds. It is axiomatic that good doctors are to be found only in those countries where the basic training is sound. A first task, therefore, is to restore to their posts those teachers who are willing to return from their exile in the last twelve years. Since their number will be insufficient, they might be supplemented by men sent to Great Britain or the U.S.A. for special courses before returning to instruct German students. The second cause is the failure to select suitable students since 1933, and more especially since the start of the war. Those who have visited Germany in recent months have been impressed by the efficiency of most German doctors of middle or advanced years; and, in contrast, by the ignorance and poor clinical judgment of the men who have qualified since the start of the Hitler regime. British surgeons, in particular, have been surprised at the low standard of the war surgery, one branch in which the Germans might have been expected to be adept. It is debatable whether all German doctors trained in recent years should not be returned for a further period of primary training; but such a measure would have to wait until the present shortage of doctors in the country has been relieved; if it is not adopted, a serious position will develop in another ten or fifteen years when these Nazi-qualified doctors become the new senior generation.

Other causes have hastened the deterioration in the war years: Germany, in common with other Continental countries which she occupied, has been isolated from the course of progress in other lands; the army has had first call on manpower; teaching staffs have been further depleted; the medical curriculum has been reduced to three and a half years; moreover, the universities have been bombed and their life disrupted. Unfortunately, there is no present indication of haste to get the universities fully reopened. Germany must correct this state of affairs by her own endeavour; but the Western Allies would best serve their own interests by giving her every assistance. It has been repeated often enough that a healthy Germany is necessary for the health of Europe.

MATERNAL WEIGHT-GAIN AND INFANT BIRTH-WEIGHT

IT would be helpful to the obstetrician if he could predict with some accuracy the probable weight of the infant at birth when difficulties are anticipated. At first glance it might seem that the infant's birth-weight must be related to the mother's gain in weight during pregnancy. But Kerr[1] explains how opinions differ on this point. There is some doubt about the comparative importance of the relative and the absolute gain in weight. Thus in forecasting the likely weight of the baby at birth, should one base one's conjecture on the actual weight gained by the mother, or on the gain taken as a percentage of her weight before conception? The findings of Beilly and Kurland[2] suggest that there is a definite relationship between the absolute gain and the infant's weight at birth. There is a progressive increase in the average weight of the baby from the 6 lb. 8 oz. babies born to mothers gaining less than 5 lb. during pregnancy to the 8 lb. 2 oz. babies of mothers who gained over 40 lb. The actual coefficient of correlation ($r = 0{\cdot}185$) is quite low, and in one case in twenty an estimate of the baby's weight based on the mother's gain may be as much as 2 lb. wrong either way. The reason for this low correlation is not far to seek. Among the factors likely to influence the infant's birth-weight are the physical inheritance from race and family, the mother's parity and perhaps diet, and its own sex and maturity. The mother's weight-gain may itself be influenced by toxæmia. Too pessimistic a view should not, however, be taken. At least some of these factors can be accounted for, while others such as diet may be controlled. One might think, indeed, that a statistically judicious blend of such simple measures as the father's weight or height with the mother's parity, weight, and weight-gain would give a useful prediction of the baby's weight at term. But as Hunter would have said "Why think? Why not try the experiment?"

1. Kerr, A., jun. *Amer. J. Obstet. Gynec.* 1943, **45**, 950.

VIRUS ENTERITIS

ACCUMULATING evidence suggests that filtrable viruses are a common cause of intestinal disease in man as well as animals. In 1942 Baker[3] showed that the naturally occurring bovine pneumoenteritis known as "scours," which particularly affects very young calves, is caused by a filter-passer. In 1943 Light and Hodes[4] claimed to have produced enteritis in calves with a filtrable agent derived from an institutional outbreak of neonatal diarrhœa. This agent, which possessed the remarkable property of withstanding boiling for at least five minutes, was not, they thought, identical with the bovine pneumoenteritis virus demonstrated by Baker. In this connexion it is worth noting that Barenberg[5] and again Folsom and Lyon[6] recorded a high incidence of pneumonitis among the fatal cases in outbreaks of neonatal diarrhœa, and that Campbell[7] in Australia recently expressed the view that the infecting agent of neonatal diarrhœa is usually airborne.

Reimann and his associates,[8] experimenting on human volunteers, now seem to have demonstrated a virus which can cause gastro-enteritis among adults. When investigating a widespread outbreak of nausea, vomiting, and diarrhœa in Philadelphia in 1943 they inoculated mice and calves with stool filtrates from human sufferers but without result. In further experiments medical students voluntarily inhaled nebulised stool filtrates and filtered garglings obtained from the patients with diarrhœa, and within four days just over half of them developed a diarrhœal illness similar to the prevalent type. The incidence of this illness in a control group of students subjected only to environmental exposure at the same time was 9%. The inhalation of filtrates from healthy people or nebulised serum from patients did not cause illness, nor did the swallowing of stool filtrates and filtered garglings encapsulated in gelatin. These results, though not conclusive, certainly suggest that the cause of this particular outbreak was an airborne virus capable of infecting via the respiratory tract.

2. Beilly, J. S., Kurland, I. I. *Ibid*, 1945, **50**, 202.
3. Baker, J. A. *J. exp. Med.* 1943, **78**, 435.
4. Light, J. S., Hodes, H. L. *Amer. J. publ. Hlth*, 1943, **33**, 1454.
5. Barenberg, L. H., Levy, W., Grand, M. J. H. *J. Amer. med. Ass.* 1936, **106**, 1756.
6. Folsom, T. G., Lyon, G. M. *Amer. J. Dis. Child.* 1941, **61**, 427.
7. Campbell, K. I. *Med. J. Aust.* 1945, **i**, 79.
8. Reimann, H. A., Price, A. H., Hodges, J. H. *Proc. Soc. exp. Biol., N.Y.* 1945, **59**, 8.

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A careful search has often failed to disclose causal bacteria in outbreaks of diarrhœa and vomiting in which the circumstances undoubtedly pointed to an infecting agent transmitted by brief personal contact like influenza virus. In other outbreaks water or milk have seemed likely to be the vehicle of transmission, judging by the general epidemiological picture, and yet both have passed all accepted tests. Extended observations of the type reported by Reimann and others are needed before the existence of human enteritis caused by virus can be freely accepted. Observers of future outbreaks of "gastric influenza" or epidemic neonatal diarrhœa need not be at a loss for working hypotheses, for, in addition to the heat-resistance and aerial transmission of enterotropic agents suggested by the recent experimental work, there is the possibility that such agents, although initially pathogenic for a single species of domestic animal, may suddenly acquire the property of affecting the human intestine.

SELECTION TESTS FOR NURSES

THE General Nursing Council recently decided to bring back the test educational examination which before the war was set to nursing candidates entering hospital. This has alarmed some employing authorities, who feel they have trouble enough already in finding candidates for nursing training. The Royal College of Nursing, while it holds that the idea of a test is sound in principle, thinks that the general-knowledge test of the past merely threw light on the candidate's schooling and home background, and gave no idea of her aptitude for nursing. It suggests that the old form of examination should be replaced by a series of tests designed to show whether the candidate has the mental and practical qualities required of a nurse. This interesting suggestion springs from a belief that the great wastage of student nurses is due largely to the acceptance of unsuitable types for training.

In a memorandum on the subject the college points out that the use of selection tests in the Forces during the war made it possible to use men from all walks of life to good advantage. This is true enough. On the other hand the Forces never attempted to apply their selection tests to those about to be recruited; they needed great numbers of men and they had to accept all those who passed the doctor, using them as best they could. Now this is exactly the plight of the nursing service today: we need such enormous numbers of nurses that we must gladly accept all those who come, and must then find ways of employing them to full advantage. It would surely be unwise at this stage to put any further obstacle in the way of the girl who thinks she wants to nurse; for members of the nursing profession, unlike most members of the Forces, are volunteers; and they also retain the right of voluntary withdrawal—a right which they seem to be exercising with increasing freedom. No doubt it would save the time of sister tutors if all candidates were tolerably educated and capable of mastering technical details from the start: but as things stand at present this is asking for the moon. There are not enough secondary-school and high-school girls in the country to meet the needs of nursing and of the other professions and occupations open to women. Nevertheless very large numbers of girls start to train as nurses every year. Some of these are simple, and some barely literate; but those of us who have worked with such girls know how well they may do, given proper training. Proper training for nursing is not given primarily in the classroom: a girl may be the despair of the sister tutor and the lecturing doctor, but the ward sister who gets at her over a bed with a sick child between them may find in her the ability to make a patient comfortable. Since we cannot pick and choose our candidates at present, our best course surely is to find ways of developing the latent ability to nurse in the simpler type of girl rather than to demand that she should conform to some arbitrary pattern.

There does seem, however, to be an important use for selection tests among the higher grades of nurses. Would it not be well to introduce them for prospective ward sisters, sister tutors, home sisters, and perhaps even matrons? This would be in line with the Forces' practice in selecting men for skilled mechanical work and for other posts requiring special qualities.

MALNUTRITION IN BELGIUM

DURING the German occupation Belgium suffered a restriction of official rations which must have meant famine if it had not been countered by a nation-wide organisation of the clandestine market. This differed from the subsequent black market, run primarily for private profit, in that it represented a rough-and-ready means of survival at the expense of the invader. From the nutritional standpoint the worst period was in 1941–42, before this organisation was perfected and before the rations had been supplemented by the distribution of herrings. Those who saw Belgium for the first time at the Liberation were apt to overlook the deprivations through which the country had previously passed, with their attendant death-rate from tuberculosis and malnutrition. True, the health of the children had been to a large extent protected, but only at the price of allocating all milk to young children and invalids, at the expense of adolescents and adults.

From the wealth of material unfortunately available, a number of valuable studies have been made. These include the Bastenie (*Médecine Libre*) report, Professor Govaerts's studies of famine œdema—of which he was able to observe several hundred cases in Brussels alone—Lucien Garot's report to the Œuvre Nationale de l'Enfance, Professor Colard's *Alimentation de la Belgique sous l'Occupation Allemande* 1940–44, and now a book by Professor Lucien Brull of Liége and his associates.[1] This last describes some sixteen studies on various manifestations of malnutrition, including observations on weight, blood-pressure, and serum proteins in over 9000 outpatients, and on hæmoglobin levels, famine œdema, nitrogen balance, intestinal function, the incidence of peptic ulcer, the assimilation of wholemeal bread and bran, and the influence of vitamin C on workmen's resistance to fatigue. The investigators conclude that protein deficiency is the principal pathogenic factor in famine œdema, leading to a fall in serum proteins and consequently diminished osmotic pressure, and also to thyroid dysfunction resulting in diminution of cardiac output and renal activity. Their monograph is a valuable contribution to the understanding of malnutrition, and when one considers the conditions under which they worked they are the more to be congratulated. The résumés in English are detailed enough to provide English readers with the more important conclusions.

ON Friday, Jan. 25, at 5 P.M. Dr. LEONARD COLEBROOK, F.R.S., will deliver the seventh Blair-Bell lecture to the Royal College of Obstetricians and Gynæcologists. His title is to be Looking Backwards and Forwards: Control of Infection in Obstetrics,

Sir ALEXANDER MACGREGOR, M.D., has been appointed chairman of the scientific advisory committee to the Department of Health for Scotland in succession to Sir JOHN ORR, M.D., F.R.S., who has resigned from the chairmanship but remains a member of the committee.

1. Les Etats de Carence en Belgique pendant l'occupation allemande 1940-44. Liége: Editions Soledi, and Paris: Hermann et Cie. Pp. 286.

A COLLECTION of medical and scientific books published in Britain during the war and sent to Russia by the British Council was lately exhibited at the State Central Medical Library in Moscow. Some 700 doctors and medical students visited the exhibition, which also included the books sent to the library by the council during the war years.

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Special Articles

SOCIO-MEDICAL SURVEYS *

JOHN A. RYLE
M.D. Lond., F.R.C.P.
PROFESSOR OF SOCIAL MEDICINE IN THE UNIVERSITY OF OXFORD

THOSE who have a primary interest in, and ready access to, populations or groups (whether these be large or small) have before them some very important opportunities in the field of health and sickness research. Of such are the medical officers of the public health departments, medical officers in the armed forces, and industrial medical officers. But some of the best opportunities and problems are those which confront school medical officers, for they are concerned with human beings still in a stage of growth and approaching the threshold of adult life and citizenship and, for obvious reasons, deserving of special and intimate study. In each instance various forms of collaboration will prove necessary.

The methods of socio-medical inquiry or of social pathology—that is to say, of investigations undertaken for the study of relationships between social circumstance and disease—include, first, the collection and analysis, with various necessary correlations, of existing statistical material bearing upon mortality or epidemic trends; secondly, the planned survey embracing both clinical and relevant social and environmental studies; and thirdly, the social experiment.

An example of the first of these methods would be a comparative study, with approved statistical technique, of infant mortality in different types of community or in the occupational or socio-economic classes of a single large community. Should such a study demonstrate an exceptional mortality in a community or class, a further investigation might be deemed necessary which could only be carried out or completed with the assistance of the second method—a specific survey. Such a survey might be designed to discover the main causes of infantile sickness and death or to assess the influence on the infant death-rate of such factors as housing, income available for food, size of family, and maternal health and efficiency. It might further become possible (for instance at a time of rehousing) to stage a social experiment—the third method—and, with necessary corrections for epidemic experience and economic differences, to compare infant morbidity and mortality in a community (or an adequate sample of it) after transfer to a new council estate with the infant morbidity and mortality of a similar population left in slum surroundings. Such an experiment, relating to the whole community and not specifically to the infant portion of it was, in fact, reported by M'Gonigle and Kirby (1936).

Here we are concerned only with the second method, the socio-medical survey. This method has for its object the ordered observation of sickness and health in human groups and of their relationships with the conditions to which these groups and their several fractions are subjected. It does not, as does the social experiment, undertake or utilise planned modifications of environment with a view to testing their effects on the health and sickness of a community, when possible with the additional check of a control group.

THE METHOD OF SURVEY

There are good reasons at the present time for considering the principles which should govern the use and conduct of surveys. Without careful considerations of method at every stage social medicine and pathology will not effectively ensure the maintenance of their own disciplines. They may then fail, as clinical medicine has too often failed, to accord to accuracy and the critical evaluation of evidence the place which they should hold in a sound medical philosophy. The terms clinical medicine and social medicine have academic and practical connotations. Both subjects may be scientifically considered and developed, but, in so far as their titles may also suggest professional practice in the one case and community services in the other, they cannot be suitably defined as "sciences." Both, furthermore, require a humanistic as well as a scientific approach. By defining them as "disciplines" we cover both science and applications and imply that their teaching, their researches, and, whenever possible, their practice should recognise their dependence on scientific methods; that at all times and in all their tasks they should require an observance of strict standards; and that these should cover the various "clinical," "scientific," or "sociological" techniques which they borrow or adapt or systematically develop for their own use, as well as the correlation of the findings due to them. For example a problem in social pathology may need the assistance of methods or techniques contributed by the clinic, the social sciences, somatometry, nutritional physiology, and radiography, and in each the technical standards must be satisfactory. For the planning and control of the whole survey (or experiment) and the subsequent analysis of findings the method and techniques of vital statistics—the fundamental science of social medicine—are also necessary.

A failure to give due thought to the development of these disciplines may lead to ill-conceived and unprofitable surveys at a time when good collaborations between the medical and social sciences are much needed and should have special value. Thus, a survey carrying an undue economic bias and lacking sound clinical collaboration or sufficient biostatistical directives may prove invalid. A nutritional survey may employ clinical or other assessments which do not take physiological variation sufficiently into account or which do not sufficiently allow for genetic or infective influences in the production of minor tissue changes. A socio-medical field survey employing non-medical workers or inadequately trained workers may rely too much on the questionnaire and so on popular opinion and individual memory, both highly fallacious things, and, even though crude assessments may seem justified when the samples are large, the findings cannot then be given a high valuation or be confidently accepted as a basis for new social planning or political action. A multiplication of observers increases error, whether their evidence be in the objective or subjective category. The findings of a survey may be recorded in a qualitative and descriptive form and in great detail; but, unless they are further supported by quantitative methods, the resultant picture remains at best as a general impression, and accurate and useful deductions may not be possible. Voluminous social surveys have been published which are mainly descriptive. Whole chapters are sometimes devoted to sample pictures and conversations gleaned among a "down town" population or to detailed accounts of psychological and domestic troubles and family interrelationships and the inferred effects of these on human health and efficiency. And yet the reader may be left with a feeling that this patiently collected material would have proved far more readable and no less convincing had it been greatly condensed and presented by an able novelist. As a contribution to social pathology the value of such surveys bears little relationship to the immense labour devoted to them. Although, therefore, illustrative material should often be included and can have great value, precise factual evidence, whenever possible in measurable forms, must always have precedence over descriptions which are verbose and complex and, perhaps, unconsciously influenced by personal opinion. Finally, a survey may either set out to record too much, or, by over-simplification, fail to include essential data.

If descriptive or qualitative surveys have their disadvantages where the social part of an investigation is concerned, the same also holds true for the medical part. Huws Jones (1938) has drawn attention to the high fallibility of clinical nutritional assessments undertaken in school-children by experienced school doctors. Not only, he showed, will individual doctors record different assessments on the same group, but the same doctor may make a different assessment on the same group after a short lapse of time. The methods rather than the doctors were at fault.

PLANNING OF A SURVEY

No survey should be undertaken without a clear objective and careful and often prolonged preliminary planning. All collaborators—expert and ancillary—should be in consultation from the start and at intervals

* Based on a communication given to the Medical Officers of Schools Association, Oct. 29, 1945.

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thereafter. In a socio-medical inquiry the minimal expert team should generally include a clinician, a biostatistician, and a medical social worker; but, as their work is "in the field," they will usually come to need the further assistance and coöperation of officers of the public health authority; of factory medical and welfare departments; of an education department and the school teachers serving it; or, perhaps, of the most responsible and intelligent members of a village community. They may further require the coöperation of the radiologist, the nutritional physiologist, or others.

Socio-medical surveys can be of very varied type. To name but a few, one survey may set out to cover the total health and sickness experience of the whole of a selected community during a given period. Another may select a particular age-group, say the pre-school child or the school-leaver, for a similar study over a particular period. A third may be concerned with a particular disease, say in an industrial community, and with its correlations with age, sex, trade, shift systems, and season, or it may attempt to compare sickness absence from some predominant group of maladies under differing environmental conditions, material or personal. The degree of complexity of such surveys varies widely.

ILLUSTRATIVE SURVEYS

By way of illustration two surveys, both concerned with children, one simple and one complex, in which I happen to be interested, may be briefly described.

The first survey is concerned with the incidence of thyroid enlargements in school-children in areas of the country where the iodine-content of the local water-supply has been recently estimated. In certain, principally inland, areas the incidence of adult simple or endemic goitre is already known to be, or to have been, high. In others it is low. Areas with high and low incidence and with high and low water-iodine determinations have been included. In inland rural districts, especially during the war period, the consumption of sea fish, the other main source of iodine, has been uniformly low. To make the survey as reliable as possible the populations studied have been confined to boys and girls between ages 11 and 15 attending council or county schools. Under war-time rationing the general nutritional status of the children has not shown wide divergencies, and social and economic variations have been less pronounced than in peace-time. The work is being conducted for and by members of the Goitre Sub-committee of the Medical Research Council.

The initial clinical problem was what to accept as "thyroid enlargement." Established goitres in this age-group in England are very rare. Adolescent enlargements of various degrees are common. Among the questions for which answers were required were the following:

(1) Does the frequency of thyroid enlargement in children vary from one part of the country to another and in relation to the iodine-content of the water and the past incidence of adult goitre? This question has already been partly answered by an extensive survey in 1924 reported upon by Stocks (1925).
(2) What degrees and varieties of enlargement occur in this age-group?
(3) Is there such a thing as demonstrable "physiological enlargement," or are all clinical enlargements evidence of some degree of iodine lack?

An ultimate objective of the whole inquiry, which (as a part of a fuller investigation) has already received a preliminary reference (Medical Research Council 1944), is to provide fresh evidence in favour of or against the general or limited supply of iodised salt for domestic consumption in this country. In order to obtain an answer to these and other questions clinical surveys of large samples of children in schools were arranged with the coöperation of the school authorities. A standard method of physical examination was first evolved and tested in a pilot survey. The full details of the method cannot be given here. Suffice it to say that there is no reliable way of measuring thyroid enlargements, but that it has proved possible to classify children into four groups in which the thyroid gland is recorded as: (*a*) invisible; (*b*) visible but soft, smooth, and symmetrical; (*c*) visible + (the "Rosetti neck") but soft, smooth, and symmetrical; and (*d*) visible but showing some departure in respect of one or more of these three qualities, in which case it is regarded as frankly pathological.

When large samples of children in different geographical areas have been examined, a statement about the varying incidences of thyroid enlargement in these areas and their correlation with water-iodine levels should become possible. Answers should also be forthcoming to the other questions posed.

The second and more complex survey, which is being conducted from the Institute of Social Medicine at Oxford, is concerned with the health and sickness experience and the growth and development of the pre-school child from birth (or as soon after it as possible) to 5 years old. All social groups within a city community are included, for the sample must be socially representative if conclusions are to be drawn with regard to the influences of environment, economics, education, or other main factors. A welfare-centre population would be inadequate for this purpose. It will be obvious that the relative sizes of the social groups in the local population must also be known, and that it may not prove easy to obtain sufficiently large and representative samples of infants in each group. The periodic examinations of the infants are both clinical and somatometric and after six months include standardised radiographic studies of skeletal features. A record of all intercurrent illnesses is kept. The clinician and the medical social worker concerned see the mother together at the first examination, and an appointment for the home-visit by the social worker for the collection of domestic, economic, and other relevant data is made at the time. Unannounced visits to the home should be made later lest a "dress rehearsal" by the mother should convey an incorrect picture. The examinations are carried out as far as possible in the welfare centres of the city and also in a private mothercraft clinic. They require close coöperation with the medical officers and health visitors of the city health services.

The preparation of appropriate record cards for this more elaborate type of survey is of the first importance. What to include and what to omit in such records can only finally be decided on a basis of accumulating experience. Pilot surveys in day nurseries and welfare centres were initially undertaken for this purpose and in order to test and practise the somatometric methods. Even so, modifications of the recording system became necessary after the inauguration of the main survey. Observations relating to maternal health and efficiency and the type and state of the home must be classified according to an acceptable convention. They could obviously vary considerably with the experience and personal standards and temperament of the medical social worker, and it was decided in this case to rely upon a single observer. The same precaution may be judged necessary in the case of the clinical observer; but, since the observations in this instance are mostly objective and when possible numerically expressed, the range of error is less serious, and with the growth of numbers and re-examinations it might become necessary to employ an additional worker. The population initially enrolled must be sufficiently large to allow for the later default, for one cause or another, of a proportion of the babies observed. It might be hoped that the defaulters would constitute a random sample, but it is almost certain that they would be found to include too high a proportion of the poorer and less educated classes. A large number of observations will be collected in relation to each infant, to each mother, and to each home. The selection of the variables to be studied and the correlations to be attempted is a matter of great importance and requires expert biostatistical advice. In inquiries of this kind, where large groups and many data are involved, it may further become necessary to assign code numbers to the items recorded, so that card-punching and mechanical sorting apparatus may be employed.

QUALITIES AND RELATIONSHIPS OF SURVEYOR AND SURVEYED

Accurate methods of observation and recording are clearly essential both in the clinical and in the social parts of any survey of this type, but accuracy is not all. An abrupt manner or a too hurried or too tedious system of examination or interrogation by a clinical or social worker may prejudice the whole inquiry. In the

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examination of groups it is just as important as it is in the examination of private or hospital patients or in researches on individuals to adapt methods of approach and interrogation to suit the intelligence, age, temperament, and sensibilities of each subject. Such surveys are concerned with human beings, and every endeavour must be made to secure the fullest and happiest coöperation of the population enrolled and to study both their convenience and the convenience of all whose collaboration is of material assistance to the responsible team. At a time when home visitations of one kind and another are becoming very common every possible consideration must be given to the housewife. The same applies to the school teacher. The purpose of the survey and its possible contributions to medical knowledge and the public health should be simply explained and reaffirmed on all suitable occasions. As far as possible all those directly interested, including the subjects themselves or their responsible relatives, should be encouraged to regard themselves as essential partners in the inquiry. Finally, an abstract of the results of an investigation should be sent to all who have given assistance and may be considered entitled to and capable of interpreting the information, including for example professional colleagues, the management of an industry, an education authority, or a group of teachers.

SCHOOL SURVEYS

Notwithstanding the numerous studies of height and weight and mentality which have already been reported there are many problems relating to the growth and development, to the health and sickness experience of school populations which await further study. The readiness with which children can be marshalled for examination and the intelligent assistance of teachers and the school nurse are a particular advantage to the investigator. The physical and mental standards and progress of adolescents in the several socio-economic groups or of school-leavers before and after the abrupt change from the life of home and school to the life of shop and factory, together with the stresses accompanying this change, call particularly for well-planned investigation. The ætiology, incidence, and age of onset of scoliosis, flat feet, ocular defects, and other disabilities cannot be profitably studied in their later stages and in hospitals or in over-selected groups. School medical officers and industrial medical officers should have ample opportunities for initiating or collaborating in such studies. They may from time to time require the assistance of others with special experience or facilities. All socio-medical investigations—their very name implies the need—require teamwork and a sharing of experience and skills. Integration of interests and actions is clearly a first function of what we have come to call social medicine, whether in the academic field or elsewhere. The practical applications of social medicine must, like those of clinical medicine, have their basis in sound pathological and other disciplines and in the development of new research.

REFERENCES

Jones, R. H. (1938) *J. R. statist. Soc.* **101**, 1.
M'Gonigle, G. C. M., Kirby, J. (1936) Poverty and Public Health, London.
Medical Research Council (1944) *Lancet*, **i**, 107.
Stocks, P. (1925) *Quart. J. Med.* **21**, 223.

PHYSICAL SOCIETY EXHIBITION

THE thirteenth exhibition of scientific instruments and apparatus organised by the Physical Society at the Imperial College of Science and Technology, South Kensington, on Jan. 1–3 was an outstanding success. The whole printing of 4000 catalogues was sold out by 3.30 P.M. on the first day, and the rooms were packed so solid with people that many exhibits could not be approached. The larger part consisted of exhibits by trade houses of new types of apparatus, many of them on show for the first time.

There were two fine displays of microscopes. Charles Baker's series 4 research microscope has all its controls fitted at or below stage level; 4 interchangeable bodies are available, designed for bacteriology, petrology, metallurgy, and dark-ground opaque illumination. Focusing, both fine and coarse, is accomplished by moving the stage, and both binocular and monocular eyepieces are available interchangeably, straight and inclined. Cooke, Troughton, and Simms were showing an even more complex instrument—the Cooke type 4000 universal research model, which has the light systems and camera-support integral with the stand. This microscope also has separate bodies designed for bacteriology and metallurgy; coarse adjustment is obtained by moving the stage, but fine adjustment is provided by moving the objective turret by a new system capable of extremely fine control. This instrument has more refinements than are needed by most pathology laboratories, which in this range are catered for by the type 3000 standard research model, a conventional design for which a variety of oculars are available.

There was not much X-ray apparatus. Baldwin showed a production model of the Farmer electrometer, capable of being run off the mains or from built-in batteries, and they have also produced a version of the radium detector popularly known as the "clucking hen," but with its note altered to such an extent that it will almost certainly be known as the "cheeping chick."

Another of Dr. Farmer's developments—the integrating X-ray dosimeter—was displayed by Marconi in a case twice as big as it need have been, but it was the only one available in time for the exhibition. Several exhibitors had the same tale to tell—their models were not in final form—but they were proud, and rightly so, to be able to show them at all so soon after the outbreak of peace. Marconi were also showing a four-channel simultaneous electro-encephalograph with ink-pen tracing on paper. This machine is equipped with 17 electrodes and will record any four pairs of combinations or any group in unison.

The only mass-radiography equipment shown was the Kodak fluorographic stand, a model elaborated for occasional use with any conventional X-ray unit, fitted with hand control for height adjustment and hand-operated film advance in the camera, and using lead numbers on the screen for checking the patient's identity.

A. C. Cossor showed a more compact version of their pioneer cathode-ray electrocardiograph, and the Clifton Instrument Co. (Cambridge) showed another model. An interesting exhibit was their 'Sphygmoscope,' which uses a cathode-ray tube to show systolic and diastolic pressures continuously; this was designed for continuous observation during anæsthesia and permits tracings to be taken. Here too was a heat-therapy dosage-rate meter, designed to read direct in pyrons; this has an appreciable time-lag and is still in the experimental stage.

Multitone were exhibiting Caplans electroconvulsion apparatus, but their pride was their large model group hearing-aid installation intended for special schools for deaf children. This includes a teacher's microphone-amplifying circuit as well as radio and gramophone circuits, and the sound is fed out to individual heavy-duty air-conduction earphones; these contain a system for obtaining a differential reproduction curve designed to suppress masking by low notes, adjusted for each child's hearing requirements. The adjustment once made is locked, and the makers claim that even the children find the attachment indestructible. On this stand also was a prototype model of an amplifier-type deaf-aid measuring $4\frac{1}{2} \times 2\frac{1}{4} \times 1$ inch fitted with midget batteries and button-base valves. The 'People's Aid,' made to sell for £12 12*s*., is the same size, but batteries of conventional type must be housed in a pocket.

Several projectors designed for film-strip or mass-radiography viewing were on show, but the heavy-duty model with air-blast cooling displayed by Pullin (Optics) was outstanding; this compact little machine is well suited for film-strip projection in a medical-school lecture theatre.

The research demonstrations had much of interest to offer the doctor. The National Physical Laboratory showed a machine for testing the leak between barrel and plunger of hypodermic syringes, and in another room a complex comparator evolved for standardising Haldane hæmoglobinometers. They are now preparing a standard for the Sahli procedure. Upstairs they showed their system for testing the X-ray dosage received by radiographers, using the dental film technique—a useful although not a precise method.

With so much on view it was impossible to do more than glance at other exhibits, which included "Endotracheal Anæsthesia," a model illustrating the acceleration of an electron in a cyclotron, statistical sorting machines, a high-speed camera which runs 100 feet of

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film through in 3 seconds with a noise like a vacuum cleaner, recording oscilloscopes, a variety of rainbows exhibited by the Colour Group, and the Metrovick electron microscope, which drew the largest crowd of all. Next year the exhibition should certainly remain open for more than three days.

THE MEDICAL SERVICES OF NORWAY

THE Norwegians seem to have managed to combine a full medical service with freedom for the patient in his choice of doctor, and freedom for the doctor to practise where he likes. It is true that this freedom of the doctor has been curtailed during the war, so as to give the central medical authorities the power to fill posts that would otherwise remain vacant through lack of candidates. But it is expected that the former freedom will be restored next spring.

Dr. Karl Evang, Director-General of Norwegian public-health services, has described [1] how his country has solved the problem. Most Norwegians are insured under the State health insurance plan, which covers both medical fees and hospital expenses. If a patient who is not insured cannot meet these costs, his municipality will pay them under the poor-law. There is thus no danger that a sick person will not have necessary medical care, or that either doctor or hospital will go unpaid. Insured patients have a choice of doctor; and, in the larger cities, so have the poor on relief. In rural areas the poor are usually treated by the district health officer, or referred to a private practitioner. Again, whether they are paying or insured, patients who enter a public hospital—and most hospitals are public in Norway—get the same care, treatment, and diet. There are no private wards in the public hospitals; but single-bedded and two-bedded rooms are available for patients who need them on medical grounds.

Membership of the national sickness insurance system has been compulsory since 1911 for wage-earners below a certain income level. The system has been gradually expanded to take in larger groups and voluntary members, and by 1940 about two-thirds of the population belonged to it. Just before the war a bill was drafted to make the scheme universal but this had to be postponed.

An insured man and his family have the right to free medical attendance by general practitioners and specialists; free treatment in hospital for 26 weeks (39 weeks for tuberculosis and cancer); physiotherapy and dental treatment where necessary; financial help to meet the expenses of childbirth or funeral expenses; disability allowances paid in cash; and family allowances when the supporter of the family is admitted to hospital.

THE DOCTOR'S TRAINING

The Norwegian medical course lasts 7–7½ years. Students complete their ordinary school and college course by the age of 21 or 22, which means that they do not qualify as doctors before the age of 29 or 30. The course is general: no-one specialises before qualifying. Since the population is scattered and many people live far from towns, the doctor must be fitted to meet emergencies which in other countries would usually be referred to a specialist. Doctors are not limited to insurance practice: subject to the temporary limitation mentioned above, they are free to settle where they like, with the choice of undertaking public-health work, general practice, or whole-time hospital work on a fixed salary. The practitioner's income from insured patients depends on what he does for them: he is paid by fees for services, not by capitation fees. This combination of medical service for the insured with relative freedom for the doctors is said to have proved acceptable to the Norwegian people, the medical profession, and the health authorities.

Specialists are required to hold appropriate qualifications, granted by boards elected from among the specialists of the medical association; and the qualifications required are stringent.

THE ADMINISTRATIVE MACHINE

While this curative medical service was being built up, preventive and social medicine were the responsibility of the State public-health service. As a result, a dual system of administration has developed, each side being headed by central bodies within the same Ministry. In the pre-war years, however, the health insurance department had begun to take an interest in preventive problems, and at the outbreak of war the two services were beginning to coöperate effectively.

The Director-General is instructed to be on the watch for anything which will benefit the health or the medical services of the country, and to propose what should be done. He is responsible for seeing that public-health measures are carried out, advises and guides boards of health throughout the country, and has powers to supervise doctors, dentists, midwives, and dispensers. The tuberculosis and mental-health services also come under his care, and his department includes a laboratory for the testing of pharmaceutical preparations, and an office for controlling the medicinal use of alcohol. He prepares the budget for the civilian medical service and is the employer of doctors in State medical institutions; he nominates candidates for public medical posts and most other medical positions of importance, also in public and private hospitals, &c.; and he advises the Ministry of Health and Social Welfare, and other government departments, on all medical problems.

The Rockefeller Foundation contributed towards the State Institution for Public Health in Oslo, on the understanding that the State would maintain it. Some of its divisions provide serums and vaccines, and carry out Wassermann tests; others are divisions of bacteriology, chemistry, and sanitary engineering. Members of the University of Oslo form a consultant staff.

THE PERIPHERAL PLAN

Boards of health, each headed by a medical chairman, administer public health locally. The chairman is paid by the State for his services as local health officer, and also derives income from his ordinary medical work. There are 378 such officers in Norway, corresponding to the same number of public-health districts; in 11 of the large cities they hold whole-time appointments. A district public-health officer is in charge of each province. His duties include control of epidemics, and care of the insane and of defective children; he supervises the work of midwives, arranges public vaccination, advises on the care of the poor, and collects statistics; he is also expected to help voluntary organisations to work together, to take his place on the factory inspection board and on the bench at the juvenile court, and to serve as a member of the building commission and other groups and bodies whose work affects public health.

1. Report on Norwegian Health Services.

On Active Service

CASUALTIES

KILLED

Captain PATRICK JAMES O'FLYNN, M.B., R.A.M.C.

WOUNDED

Captain SAMUEL BRADSHAW, M.B. Lpool, R.A.M.C.
Lieutenant A. R. BRAILSFORD, R.A.M.C.
Captain MARGUERITE E. M. DAY, M.B. Edin., R.A.M.C.
Captain H. W. HOLLAND, R.A.M.C.

AWARDS

MENTIONED IN DESPATCHES

Surgeon Lieutenant A. P. B. WAIND, R.N.V.R.

MEMOIR

Captain BERNARD ALDRIDGE, who was reported to be a prisoner-of-war in Japanese hands, is now believed to have been lost in a Japanese transport between Singapore and New Guinea in October, 1942. The elder son of Mr. and Mrs. A. H. Aldridge of Bournemouth, he graduated in medicine at the University of Edinburgh in 1938. Afterwards he spent eighteen months as a medical officer at the St. James Hospital, Portsmouth, and but for the war had planned to specialise in psychological medicine. A lively and agreeable companion and colleague he showed the same keen enthusiasm for his work as for his hobbies, which were sailing and the O.T.C.; "he enjoyed life, had good health, and seemed the promise of a useful man." He married Dr. Patricia Goddard, also a graduate of Edinburgh, and they had one son. He was 28 years of age.

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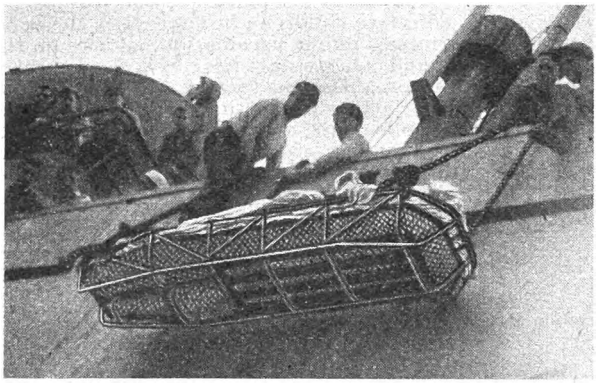
In England Now

A Running Commentary by Peripatetic Correspondents

WHEN you are called out five miles to sea to visit an American Liberty ship it is a comfort to find a fully stocked medicine chest and the larder full of penicillin—different from the British Merchant Service who still seem to rely on the remedies well known to Emma, Lady Hamilton.

Having diagnosed a six-day-old diverticulitis in an American seaman, I left the purser to give him four-hourly injections of penicillin and assured the captain that he would travel safely to Antwerp some twelve hours later. Alas for prophecy. Midnight came and found the ship still at anchor in a thick fog while I, comfortably in bed after a hot bath, listened to the distant voice of H.M. Coastguard as he passed on the last stage of a message relayed laboriously from ship to ship: PATIENT COLLAPSED AFTER THIRD INJECTION PENICILLIN HAVING CONVULSIONS GIVEN MORPHIA REQUEST ADVICE. CAPTAIN. As I could think of none fit for the signaller to listen to, I told Coastguard that I should try to revisit the ship, and half an hour later was helping to push a ghostly launch down a shingle beach to an invisible sea.

We knew from our earlier visit the approximate position of the ship, but a four-knot tide sweeping north made a direct compass course impossible. Our coxswain, very dubious about the outcome, steered half a mile due south along the shore before setting the theoretical bearing from the starting-point, which he said would allow for drift. Then putting the throttle full ahead we belted into the darkness at our full speed of six knots. During the six years of war, we had not been allowed any lights, so it did not occur to anybody except myself that a searchlight in the bows would be a good investment.



Deep wire stretcher (adapted from the undertaker's).

However, except for some nautical object which grated along the side of the boat and disappeared into the darkness, we saw and heard nothing but the rhythmical beat of the engine for twenty minutes. Then our steersman, consulting his watch, decided that we had arrived and began to cast in circles. Suddenly a mountain loomed up on the port bow with a halo on top and resolved itself into a Belgian freighter, and, more fortunately still, a vessel we remembered having seen earlier in the day. A consultation among the crew yielded the opinion that we were about eight cables (¾ mile) too far to the southward, so we veered north and the next ship was right.

As I scrambled up the twenty feet of rope-ladder the purser came to meet me with voluble thanks and evident anxiety because he, poor devil, thought the catastrophe must be his fault. Assuring him that he was quite blameless I went at once to the ship's hospital and found the patient collapsed and blue with a pulmonary embolus, and the mate in the characteristic attitude of the "Doctor" in Luke Fildes's famous picture. Calling up the skipper I arranged for four men to lower the seaman down with separate ropes in a deep wire stretcher to the boat now lying in a cone of light from an overhead cluster (see illustration). Then, going down first, I helped the others to pull him in and wedge the stretcher across two thwarts before casting off into the fog.

Just as we drew away from the ship a dark object bobbed along the tide race and our coxswain reached for a boat-hook to pull in a cask of brandy. A yell from the bowman stopped him in just time from hooking a horn he couldn't see and the mine swept between us and the ship harmlessly into the night. Half an hour later we struck the beach within a few yards of our station—another bit of miraculous navigation, seeing that it involved just missing two wrecks and the remains of the pier. As the boat crept up the beach on a power-winch towards the waiting ambulance and its yawning attendants we unanimously awarded our coxswain, a bachelor, the Order of Chastity for his inspired efforts. But on general grounds and with the mine incident in the background we decided that the award would have to be (Second Class).

P.S.—The patient is now nearly well again.

* * *

"*Ten million bananas have arrived at Avonmouth!*" Impressive words to greet the ear when the wireless was turned on two minutes late for the 9 o'clock news. Throughout the war bananas have been a symbol of something lacking, something longed for, and something we expected to get directly hostilities ceased. But why bananas? True, more than one song has been written about them and they are a pleasantly portable snack for a long journey. Perhaps the fact that they reach this country a bright green, only to appear resplendent in the shops in their golden and black jackets a few weeks later may appeal to some. But why not kirby grips, nail-brushes, zip fasteners even? Would the nation as a whole be impressed by the fact that ten million zips had arrived at Plymouth? They would not get a civic welcome. They might call forth a few cynical remarks from male listeners about needless luxuries, for women, but interest would fade almost before the announcer's voice had grown dim; and yet for years zips have been almost unprocurable except through the black market. Yet, say what we will, the very word banana causes a thrill of excitement.

Perhaps as children we found one in the toe of our stocking on Christmas morning. In the darkness we were puzzled by that cold, leathery, slightly damp form. If we were very young we squeezed until its contents burst over our fingers. By morning all that remained were a few adherent masses of sticky pulp covering stocking, sheets, and pillow. No wonder our mothers regretfully decided that bananas were no fit present for the young. Looking not so far back we recall that delicious dish that we've dreamed of in the last six years and sometimes felt we might never live to taste again—bananas mashed with cream. But that is still only a hope for the future.

Many a child's diary for 1946 may start with the words: "I had a banana today." Maybe alas he will add, "and I was sick afterwards." I wonder whether a nation grown accustomed to six years of plain living and offered past luxuries will turn sick at such things and return to its plain fare? The stoics among us hope so.

* * *

Whitehead says that civilisation advances not by thinking more but by "extending the number of important operations which we can perform without thinking about them." If this is so my present occupation will soon make a savage of me. I find that examining men for demobilisation requires my fullest attention for slightly longer than I can usually apply it. The first twenty or so are pretty straightforward. The second twenty occasion only very minor lapses, like suddenly remembering that the last man but three had varicose veins which I forgot to put down. (The clerks are used to this and carefully keep the forms in strict order.) But when we get in the fifties I become completely befuddled and anything may happen. Inspecting the left nipple through an auriscope or auscultating the right eye I can get away with if I am sufficiently solemn about it, and it is apparent only to me that I am sitting down to fill in the form realising that my mind was a complete blank while my body went through the motions. But this morning I astonished a poor fellow by asking him to open his ears wide. Maybe Whitehead is right and I had temporarily outstripped evolution.

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Letters to the Editor

WITH DETRIMENT TO OURSELVES

SIR,—In this country facilities for postgraduate medical training and research have been meagre, and interest in this branch of medicine has been slight. Vienna, Berlin, Paris, Lausanne, and other Continental medical centres have always attracted medical visitors. In these cities reception for the medical visitor has been organised, and he was treated as a welcome guest. London has been given a wide berth owing to the parlous state of such facilities.

Some years ago a Dominion doctor ventilated his grievance in your Grains and Scruples.[1] He wrote: "all declared they would never again bother to go to Great Britain unless conditions and the *attitude* (italics mine) of the men in the great hospitals changed radically. In London and Scotland we were made to feel, perhaps quite unintentionally, that the overworked hosts had no time to give us. At best we felt we were just tolerated . . . certainly we were not welcomed." That was the lamentable state of affairs in pre-war days, and if a Dominion doctor received such a raw deal what hope was there for a foreign medical visitor?

Professor Grey Turner has pleaded in your columns[2] for the establishment of a Central Bureau of Medical Information. The British Postgraduate Medical School at Hammersmith has never really been a medical mecca worthy of the capital city of the Empire. With niggardly financial support and inadequate accommodation it could not hope to be. But now—praise be to Goodenough—a world centre for postgraduate training and research is to be situated in London. Let's get on with it and quickly and without cheeseparing. Provincial centres must be included, since many of their medical schools have offered warm hospitality to the medical visitor which the London schools have often failed to do. The fault is ours, through neglect of this problem, that we now find ourselves caught on the wrong foot so far as our own demobilised doctors are concerned.

Many are the friendly contacts that have been made between the doctors of the United Nations. Those who have been stationed in this country have expressed admiration for certain of our methods. They want to return at some future date to renew such contacts and they look to us as leaders in some branches of medicine. We have little to hide and much to show; but we just don't bother to do it. If in the testing time of war such liaison and interchange was possible, surely in peace it is not past the wit of us to perpetuate such international comradeship? The British Council is trying to cope with requests from doctors all over the world who are wanting to learn our methods and gain a first-hand experience of our way of doing things.

There needs to be a committee, truly representative and of a high level, which would integrate all existing facilities in the United Kingdom. It would decide in which clinic the visitor would best be placed. It must make provision for (1) those who wish to work for one or two years in their specialty, and (2) the visiting professor who wishes to stay for three months seeing our specialists at work. If Switzerland could organise such a service (and benefit commercially), then surely we, with our greater resources, can do the same. The excuse of shortage of beds cannot be accepted, for there is a wealth of clinical material in the municipal hospitals that should be utilised.

We need to establish a postgraduate service on the grand scale. One that would satisfy doctors from the Dominions, the Colonies (coloured or not), and foreign countries, and at the same time be attractive even to a visitor from the United States. If we fail, then these doctors will look to another country for what they want. One hopes the Minister of Health is planning big in this respect.

It would be with detriment to ourselves if through short-sighted economy and traditional insularity we failed to maintain a prominent position in world medicine.

London, W.1. W. C. W. NIXON.

1. *Lancet*, 1938, ii, 1082.
2. *Ibid*, 1940, i, 342.

R.M.B.F. CHRISTMAS GIFTS

SIR,—It is with great pleasure that I can now announce that the Christmas gifts appeal which I launched through your columns has reached the magnificent total of £2127, a new record. In view of high prices and the scarcity of the amenities of life I asked my colleagues for £2000, a sum which in view of last year's record I scarcely dared to hope would be achieved but which has actually been passed by a handsome margin. This means that all our beneficiaries are receiving £4 as a Christmas gift, and there is enough over to give some of the poorest £2 for the New Year.

My committee and I are deeply conscious of the great help afforded by the medical press in supporting and giving publicity to this appeal, and to you and your colleagues of the press, as well as to all the generous contributors in the profession, we tender our most cordial and most grateful thanks.

Royal Medical Benenevolent Fund,
1 Balliol House, Manor Fields,
Putney, London, S.W.15. ARNOLD LAWSON,
President.

CONDITIONS OF MENTAL HEALTH

SIR,—Lead-poisoning is a notifiable disease, and if a man develops evidence of intoxication steps are taken by the Inspector of Factories to eliminate or minimise the risk of further cases arising. A diagnosis having been made, no-one would think of telling the man that his symptoms are due to the nature of his work, and that as that work is part of larger industrial interests there is nothing that can or will be done about it, so that under the circumstances he will have to continue to expose himself to the toxic effects of lead. Yet in a leading article on The Injured Back in your issue of Oct. 6, which has just reached me, it is implied that a workman who breaks down because of an "intolerable work situation" should be referred to a psychiatrist.

Surely the more logical procedure would be to notify psychosomatic disease, arising from the conditions of work, to the Factory Inspector, who should have legislative powers to insist on the necessary improvements.

In the same issue Sir Adolphe Abrahams draws a cross and inserts the words "love," "play," "work," and "worship" at the four corners. Work, he states, must be "psychically satisfactory, free from monotony, drudgery, anxiety, fear, gross physical insults, lack of progress or of production; the foundations of 'overwork,'" and he goes on to say that fatigue is the result of irregular living. But surely it is useless to instruct patients in correct living if, unlike Sir Adolphe Abrahams, they are not among the privileged few, who, merely by an effort of will, can satisfy conditions of mental health.

Grays, Essex. R. N. HERSON.

BIOLOGICAL DANGERS FROM ATOMIC FISSION

SIR,—The fact that I have been closely associated with Dr. Wiesner in work on male infertility makes me hesitate to comment on the subject he raised in your last issue, lest my intervention should not seem spontaneous. Before his letter appeared, however, I had already despatched an article on the same subject to another journal. In any case, the subject is of such importance that all personal considerations may be put on one side.

When any advance made by the technicians is found afterwards to have unexpected repercussions on health, the doctors are called in to discover an antidote; health measures follow in the wake of material progress. This is generally inevitable, since the injurious effects of the new discovery do not manifest themselves until it has been put into general use. But in the case of atomic energy there can be no excuse for postponing the study of its biological effects. We plan to make use of a force which is already known to have a profound influence on living tissues, and (as Dr. Wiesner has emphasised) more particularly on the cells responsible for continuation of the race. Surely therefore no time should be lost in planning the appropriate research.

Much work has already been done on the action of X rays and radium on tissue cultures and also on the structure of the testes, and methods have been devised for protecting from injury those who work with them. But the quantity of radium handled in hospitals only amounts to a few milligrammes, and the quantity of

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radio-active material about to be produced by the fission of uranium will be equivalent to thousands of grammes of that element. It should be noted that, although all possible steps were taken to safeguard the general health of those working on the atomic bomb, no special investigations were made on the effect of atomic energy on the cells most likely to be injured by this work, the cells of the germ-plasm. The Smyth report states that although the general effects of atomic radiations were known to be similar to those produced by X rays, very little detailed knowledge was available, and it admits that "no sure means were at hand for determining the adequacy of the precautions."

In its preliminary report the Royal Commission on Population says that it has found no reason for believing that involuntary sterility is a factor of any importance in the drop in the fertility-rate. I am disposed to think that this may in part be accounted for by the fact that, rich in talent though the commission undoubtedly is, it contains among its members no-one whose name in the past has been associated with any intensive study of human fertility. It may well be therefore that the high incidence of subfertility in otherwise healthy males has not yet received the consideration it deserves. Personally, it seems to me difficult to account for this subfertility, and for the changes so often discovered in the seminiferous tubules, without postulating the existence of some hitherto undiscovered factors in our highly complex industrial civilisation which have an injurious effect on the sensitive germ-plasm. But whether this be the case or not—and I agree that it is purely speculative—there cannot be the slightest doubt that the energies about to be let loose on the earth will be fraught with biological danger and that they are in need of careful study.

The medical profession will have a heavy responsibility to bear if with full knowledge of the danger ahead it waits until the industrialists have completed their plans before it starts to investigate their biological consequences.

London, W.1. KENNETH WALKER.

PROSTATECTOMY

SIR,—I thank Mr. Terence Millin for his lucid observations on several of my comments. I admit that his term "retropubic" is more accurate than the term "prevesical."

My presumption that, should the retropubic operation become a routine procedure, in many instances a suprapubic fistula would have to be dissected out and the bladder closed as a prelude to the actual prostatectomy, appears to be correct. Many suprapubic fistulæ are encased in fibrous tissue, and in such circumstances their dissection consumes much time. The sum total of two deliberate procedures is likely to overtax the feeble reserves of an old man, particularly if he has a low blood-pressure. I therefore suggested that retropubic prostatectomy may eventually be relegated to selected cases only. In the course of studying the world's urological literature for the past thirteen issues of the *Medical Annual*, I have noted that the advent of procedures that aim at doing away with suprapubic drainage after prostatectomy are followed by a deluge of contributions reflecting ultra-enthusiasm. As time goes by, such enthusiasm is sustained only in highly specialised clinics that can maintain a standard of skilled aftercare not vouchsafed to the average operator. The occasional occurrence of postoperative hæmorrhage, which can be a very serious matter if the bladder is closed, is the cause of much of this waning of enthusiasm. Time will show whether retropubic prostatectomy is free from this disadvantage.

On Mr. Millin's final observation regarding my comments, I am on more certain ground. I am amazed to read that he has found that nicking of the periosteum of the pubis leads to chronic osteitis. I am aware that necrosis of the pubis is a frequent and troublesome complication of war wounds involving the pubic bones and the bladder; but here, in most instances, a piece of clothing has been carried into the depths of the wound. Considering the comparative rarity of the condition, I have treated a large number of cases of intrapelvic rupture of the urethra where the pubis has been fractured. None of these patients developed osteitis. In separating an adherent suprapubic bladder sinus I have many times used the periosteal elevator to clear the back of the pubis from the bladder; none of these patients have developed osteitis. A cursory review of the literature for the past ten years has rewarded me with but one example of this complication; it followed severe comminution of the pubic bone in a case of an extraperitoneal rupture of the bladder. Even if osteitis from urinary infection were to be feared—and I do not think it is—I cannot understand why Mr. Millin shudders at the thought of an osteoplastic trapdoor; for I understand that in retropubic prostatectomy there is no seepage of urine into the cave of Retzius.

London, W.1. HAMILTON BAILEY.

MORE BEDS OR BETTER OUTPATIENT DEPARTMENTS?

SIR,—Dr. Lister's letter leads me to recount the system I used for medical outpatients while in charge of the medical division of a Royal Air Force hospital; for it may possibly be suitable for medical cases at certain other hospitals.

No case was admitted to hospital unless acutely ill. Other cases (unless urgent) were seen in the first place as outpatients, by appointment within 10 days of request. With the request for appointment, which was sent by post unless urgent, the unit medical officer (i.e., the general practitioner) sent a form stating the clinical history and his findings and the point on which he particularly needed an opinion. On receipt of this a clerk gave the appointment. Each morning the forms for the afternoon's outpatients would be looked through by the specialist, and a note pencilled on them of any tests which would obviously be necessary before an opinion was given. For instance, "chest X ray and B.S.R." might be written on a form where pulmonary tuberculosis was suspected; or "chest X ray, E.C.G., and W.R." in a case of angina. A secretary would then abstract from the form the essentials of the history and enter them on the laboratory and X-ray request forms, which would be checked and signed by the medical specialist later in the morning.

When the patient came at 1.30 P.M. for his appointment, he would if necessary be directed immediately to the X-ray department and laboratory, and instructed to bring his wet X-ray or E.C.G. films back with him. The laboratory reports were sent back as soon as ready. The clinic would commence with cases such as thyrotoxicosis in which laboratory tests or X-ray films were not usually necessary, and by the time two or three such patients had been seen the others would be coming back from the laboratory and X-ray or E.C.G. departments with their results and wet films. In nearly every case, therefore, the patient was seen only once, with all the evidence needed for forming an opinion, and after the clinical history had been taken and an examination made he was passed into a dressing-room (to be out of hearing) while a report was dictated to the typist. He waited for the report to be typed and signed and took it back in a sealed envelope to his unit medical officer.

This system saved hospital beds, prevented the deterioration of morale which would occur in a fighting service if men were put into hospital when not ill, and avoided the uncomfortable situation in which the patient returns to a doctor who does not know the specialist's opinion. For the system to work well it is necessary to have:

1. Reasonable and legible notes sent by the general practitioner with the request for appointment. The system cannot work unless the specialist can form an initial picture of the case.
2. Collaboration of the laboratory and X-ray departments in giving priority to outpatient work for the first hour or two of the session.
3. Adequate secretarial help. It does not seem to be generally realised how much of the time of a physician at outpatients could be saved for specialised medical work by good secretarial help.

"Staggering" of appointments was not found useful, for we could not judge beforehand which cases would need a longer or shorter time to do them justice, or which results would come back more quickly from laboratory and X-ray department. The number of outpatients was reduced because most of them only made one visit.

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Patients who had come from a distance and needed radiography of stomach and duodenum, glucose-tolerance curves, or urea-clearance tests, were detained overnight in a special hut. In civilian life a hostel with only one nurse attached would meet this need. Such patients had their tests or barium-meal X-rays the following morning, and later that afternoon were seen with the results and reported on.

With this filtering of cases at outpatients the wards should be occupied only by patients who are acutely ill, those in the early stages of convalescence, or those with unusually complicated problems of diagnosis. Most outpatients need make only one visit, and the report to the practitioner is dictated while detail is fresh in the mind. Further economy of beds in principal hospitals can be obtained by means of:

1. Convalescent hospitals, which need not be staffed by specialists but could be visited periodically and in emergencies by a specialist from the parent hospital.
2. Hospitals for care of the chronic sick, to which the parent hospital could transfer cases.
3. Absence of delay in starting investigation. A block occurs if the laboratory and X-ray facilities are not adequate to do tests and get results back quickly. The doctor should after examining the case immediately on admission try to get all the necessary special tests going at once, and if possible not think of them one by one over the next week or two.

Other aids to efficiency in the running of hospital wards are:

1. A quite light sideroom where the physician can take his cases and examine them, to leave the ward, which is usually understaffed in these days, more time to get on with its inevitably noisy routine, and where patients who are psychologically ill can talk in private.
2. A 24-hour laboratory service (i.e. a resident clinical pathologist, or at least a resident experienced laboratory technician) and a duty radiographer. It is not satisfactory if these aids to diagnosis are only available immediately for emergencies if the patient happens to be admitted between the hours of 9 A.M. and 5 P.M. on Monday to Friday.
3. Side wards, about 3 to every 20-bed ward, where suspected cases of infectious diseases can be put, where a major fight for life can be fought out without distractions, and where the patient who must die can do so in peace and dignity, and without causing unnecessary distress to other patients.

In working such a system under a National Health Service, although it might be possible to have sufficiently well-prepared and legible notes sent from doctors (and typewritten notes sent back!) it might be hard for clinicians to cope with administrators who assessed the work according to the number of beds occupied or the average duration of stay in hospital. An outpatient dealt with in the above fashion will often receive in a single afternoon at least four-fifths of the attention he would at present get during a fortnight's stay in hospital. Obviously filtration of inpatients in this way will mean a lower limit for the number of them that can be properly looked after by even the swiftest and most competent physician.

Unfortunately there are no statistics which show the quality of good clinical work, and how full and accurate work on one occasion can save numerous avoidable attendances.

Bristol. A. NELSON-JONES.

INFUSION INTO THE INTERNAL SAPHENOUS VEIN

SIR,—Mr. Kirkham's clear description of cutting down on the internal saphenous vein will certainly be very valuable to the newly qualified house-officers for whom he is writing—when that method is necessary; but in my opinion it is a pity to suggest that it is necessary solely on the score of the length of time for which the transfusion may be required. The intravenous route is nowadays used for so many purposes, some of which are urgent and life-saving, that the unnecessary sacrifice of a single vein is wrong. Twice recently I have seen patients requiring immediate transfusion who had had all veins round both ankles and elbows cut and tied during the treatment of previous accident or illness. Although not insuperable, the difficulties of treating such a patient are enormously increased.

It is true that a sharp needle is not satisfactory for prolonged infusion; if it does not actually perforate the vein wall the point inflicts repeated trauma on the intima, promoting thrombosis. The ideal tool for avoiding this is one which is sharp for piercing the skin and vein wall but which leaves a blunt instrument in the vein lumen. Many such have been devised, and a very good example is the Guest cannula. This consists of a sharp needle fitting snugly into a cannula through which it projects about 2 mm. The fit is so good that the "shoulder" made by the rim of the cannula does not cause any extra difficulty in penetration of the vein. The assembled needle and cannula are inserted into the vein and the needle withdrawn leaving the cannula in the lumen, up which it can be slipped as far as is desired without fear of perforating the vein again. The inside segment being a hollow needle rather than a trocar means that blood is seen immediately the vein is tapped, thus reducing the manœuvre to the simplest possible. In this hospital both the internal saphenous and the small veins of the hands and feet are regularly used in this manner by newly qualified residents, and all our patients are women, whose veins are not as a rule so easy as those of the male. Should the infusion continue for more than four or five days the vein will very likely thrombose, particularly if much glucose has been used. This occurs no more readily than with a tied-in cannula, but it can be prevented more easily, for with such a needle it is a simple matter to ring the changes on the veins, say, every 48 hours and so preserve them all.

This is a most important subject and Mr. Kirkham's contribution to it is stimulating and welcome.

South London Hospital for Women. M. M. C. LOUDEN.

ANAEROBIC STREPTOCOCCAL MYOSITIS

SIR,—The article by Miss Hayward and Professor Pilcher in your issue of Nov. 3 requires comment. Freedom from sepsis and necrosis depend on factors which have very little to do with the type of organisms found, whether they be streptococci or clostridia. The difficulty is in the practice of wound excision. This sounds a simple procedure; and it is, to those who have had the opportunity of seeing it properly performed.

The case recorded in the article is self-explanatory. The fact that dead tissue was found on the 8th day shows that the first operation was inadequate. Hence the muscle gangrene following suture of the wound on the 2nd day, which was carried out in spite of the "doubt about the viability of the medial flap."

The contemporary emphasis on early wound closure is dangerous, since wound excision will continue to be wrongly understood by some surgeons, who will sooner or later sew up a wound and bury dead tissue, with gangrene as the inevitable sequel. The experience of the war has confirmed the brilliant teaching of Trueta, that the most important step in the treatment of wounds is correct wound excision. It is the true wound antiseptic. The type of organism found is very much of secondary importance.

St. Margaret's Hospital, Swindon. F. LOUIS.

TREATMENT OF SYPHILIS WITH PENICILLIN

SIR,—The interesting paper on this subject by Lourie et al. in your issue of Dec. 1 omitted to mention important details regarding the practical application of the large-dose method described—namely, the form of penicillin salt used in the trials, and its potency as expressed in units per mg. of the dried preparation.

Clevedon, Somerset. C. A. GREEN.

*** We understand that all the penicillin used in this work was prepared by British commercial concerns. It was supplied in the same form as for general distribution for parenteral administration, and naturally conformed with the requirements of the Therapeutic Substances Amendment (No. 2) Regulations, 1944, which stipulates that "a preparation of penicillin intended for use in making solutions for parenteral injection shall not contain less than 150 units of penicillin per milligramme." Actually the preparations varied in content from 300 to 600 units per mg. Only the sodium salt was used.—ED.L.

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SULPHONAMIDE ANURIA

SIR,—At a hospital where I was serving it was customary for cases of sulphonamide hæmaturia or anuria to be jointly discussed by the officers in charge of the medical and surgical divisions. When the surgical division was closed down, all patients requiring surgical care had to be transferred by motor ambulance to another hospital 8½ miles away, along a section of the Kohima-Imphal Road. This part of the road was good, but not devoid of bumps and slopes.

A patient with sulphapyridine anuria, who was in considerable pain, was given an injection of morphine gr. ¼ and atropine gr. 1/150, and sent on this journey. On the afternoon of the following day he returned, accompanied by a note saying that soon after arrival he had begun to pass urine, containing red-blood cells. About 24 hours after transfer the urine had become normal in quantity and quality.

Five similar cases occurred in the following months. All the patients left the hospital with empty bladders, which had filled up by the time they reached the other hospital, where they reverted to a state of normal renal function. These events caused considerable comment both of a professional and non-professional nature. When a seventh case of sulphapyridine anuria arose, the patient was given morphine and atropine as usual and taken for a "ride" on the winding and hilly inter-hospital road. At the end of the journey, after 45 minutes, he felt an urge to pass water, and next day his renal function was normal.

There were no further cases of the same kind before the hospital moved and I was transferred to India Command. But the above observations suggested that it would be worth attempting to treat sulphonamide anuria by some device which would shake up the patient and thus dislodge the obstruction. Lieut.-Colonel Barton, officer commanding a battalion of Rajputana Rifles, kindly produced a rocking-chair made by his regimental carpenter; it allowed rocking only in the antero-posterior direction, without sideways movement. When next a case of sulphapyridine anuria occurred the patient was given morphine and atrophine as before, and a quarter of an hour later was rocked for 20 minutes in periods of 7 minutes each with a break of 3 minutes between them. Two hours later he began to pass hæmorrhagic urine which soon cleared. Six other cases of sulphapyridine anuria, and one of sulphaguanidine anuria, were treated likewise, and all responded satisfactorily.

The essence of this treatment is the restoration of free urinary flow by dislodging the obstructing mesh of crystals, blood, and mucus by rocking movements, after pain and spasm have been controlled with morphine and atropine. Other methods employing mechanical force have been described by other workers, but our accidental discovery of the value of rocking may be of interest to some of your readers.

India Command. S. F. SEELIG.

INGUINAL HERNIA

SIR,—Lieut.-Colonel Brandon has called our attention again (Dec. 22) to the importance of adequate repair of the internal ring in the operation for oblique hernia. There is no doubt that such repair would greatly reduce the recurrence-rate in men of military age. Whether an efficient muscular internal ring can be constructed in a more lateral position, however, is problematical.

In April of this year, while in Rome, I had the privilege of several discussions with Professor Bastianelli on the subject. He has given much attention to the matter over many years; he is now well over 80 and is still an active surgeon. He told me it was one of Bassini's original tenets that the internal ring should be removed as far as possible from the external ring. With this object in view, Bassini for some time divided the internal oblique muscle in the manner described by Lieut.-Colonel Brandon, and made a new muscular ring in a more lateral position; but later Bassini abandoned this manœuvre because he thought it inadvisable to divide the muscle origin in this position by an incision across the line of its fibres, which also imperils its blood-supply from the deep circumflex iliac.

Bristol. W. M. CAPPER.

Public Health

London in 1944

Sir ALLEN DALEY'S latest interim report [1] as medical officer to the L.C.C. shows that in 1944 the population of the county of London was down by 40% compared with 1938; chiefly through evacuation and war service it had fallen from 4,062,800 to 2,462,500. Up to the end of the year 17,811 civilians had been killed by enemy action, the highest casualty-rate being in Bermondsey in 1940 and in Deptford in 1944. When the war started there were 814,498 dwellings in London: of these 709,518 were affected by bombing, about 70,000 being destroyed, 56,000 rendered uninhabitable, and 66,000 seriously damaged.

Maternal mortality in London is still decreasing and in 1944 reached the record low level of 1·7 per 1000 live births; it has in fact fallen by more than half since 1934. The birth-rate steadily increased during the war years although the marriage-rate has decreased since 1941. Infant mortality, at 51 per 1000 live births, was the same as in 1943.

The nutritional condition of London school-children is considered better than in 1938. After the evacuation of children in 1944 there was no recurrence of the complaints about their condition which were received in 1939. On the contrary many letters referred to the surprisingly good health and cleanliness of the children, especially in view of the state of London and the shelter life which then prevailed.

There was a decrease in the number of new notifications of tuberculosis from 5848 in 1943 to 5729 in 1944, and the death-rate from pulmonary tuberculosis fell from 0·88 per 1000 living to 0·84. Mass-radiography was continued and it is stated that for every 10,000 persons who volunteer to have their chests X-rayed 24 are found to be in need of sanatorium treatment.

Diarrhœa and enteritis caused 427 deaths among children under two years of age, or 9·58 per 1000 live births, compared with 4·97 for England and Wales. The persistently heavy rate in London is being investigated. The number of new cases of venereal disease attending clinics declined, but it cannot be assumed that the real incidence is diminishing, "for they are still a serious menace to the public health." There was a continued fall in the number of mental patients: the total under care in hospitals and institutions at the end of 1944 was 30,372. The acreage farmed by the L.C.C. mental health services increased from 2789 in 1939 to 6559 in 1944.

Development of the Tuberculosis Services

THE Joint Tuberculosis Council will shortly circulate a report suggesting that joint boards, with executive powers, should be set up for tuberculosis work. The area served by each board would be approximately the same size as the new regions under the projected National Health Service; while local administrative units would serve a population of about 250,000. The senior clinical tuberculosis officer for each region would have access to the joint board as of right.

Other points made in the report are:

The environment and preventive aspects of tuberculosis work—i.e., the dispensary and domiciliary work—should not be divorced from the clinical aspect. Tuberculosis clinicians, therefore, should have responsibility for their work at all its stages.

A not inconsiderable advantage of a remodelled tuberculosis service would be the opportunities for promotion which it would create, thus providing the incentive for the best clinicians to devote themselves to the work.

A sine qua non of a successful tuberculosis service is recognition of the tuberculosis clinician as a specialist, accorded rank and pay appropriate to his status.

Copies of the report will be obtainable from the hon. secretary of the council (Dr. Norman England), 1, Becket Street, Oxford.

1. Published by London County Council. Obtainable from P. S. King and Staples, Ltd., 14, Great Smith Street, S.W.1. 1s. 6d.

THE KING has given permission to Air-Marshal Sir Harold Whittingham, F.R.C.P., to wear the insignia of a commander of the Legion of Merit conferred upon him by the President of the United States.

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Obituary

HERBERT MICHAEL MORAN

CH.M. SYDNEY, F.R.C.S.E., F.R.A.C.S.

Herbert Moran came to this country in 1908, a year after he graduated at Sydney, as captain of the first Australian rugby XV to visit England. Though a small man he was already a famous forward, and he was not only a good player but also a good leader. When the team returned to Australia he remained here for postgraduate work and in 1909 he took his F.R.C.S.E. Meanwhile he had become interested in the development of radium energy, and to make use of the knowledge he had gained he took back with him to Sydney several thousand pounds' worth of the, then, new radium needles. A pioneer of this specialty in Australia, he was appointed cancer specialist at Prince Henry's Hospital, consultant at the Royal Prince Alfred and the North Shore Hospitals, surgeon to the St. Vincent's and Lewisham Hospitals, and lecturer in radiotherapy at Sydney University. He also founded and was joint editor of the *Sydney University Journal of Cancer Research*. In 1934, at the invitation of the local branch of the British Empire Cancer Campaign, he visited New Zealand to lecture to the medical profession on the treatment of cancer by radium. In the following year, in which he retired, he presided over the radiological section of the B.M.A. annual meeting which was held at Melbourne.

Way, Colchester.

A doctor and an athlete, he was also a man of letters. He started the teaching of Italian language and literature at the University of Sydney, and for this work he was awarded the Paul Boselli medal and made a knight commander of the Order of the Crown of Italy and a chevalier of the Order of St. Maurice and St. Lazarus. A life member of the Dante Alighieri Society, he also belonged to the Sydney Foreign Language Association and to the French Society. Of his own writings, *Viewless Winds*, the first part of his autobiography, was published in 1939 and a continuation, *In My Fashion*, is now in the press. His novel *Beyond the Hills Lies China* appeared last year.

During the 1914–18 war Moran served with the R.A.M.C., and in 1939 he rejoined the corps. Next year with the rank of lieut.-colonel he was appointed an additional president of medical boards in the Eastern Command, a position for which his interest in human nature and shrewd judgment well fitted him. He died at Cambridge on Nov. 20 at the age of 60, while awaiting a passage home to Australia.

CHARLES ARTHUR KINAHAN BALL

BT., M.D., M.CH. DUBL., F.R.C.S.I.

Sir Arthur Ball, regius professor of surgery in the University of Dublin since 1933, died suddenly on Dec. 21 at the age of 68, after some months of indifferent health. The son of Sir Charles Ball, first baronet and regius professor of surgery at Dublin, he was educated at Shrewsbury and Trinity College, Dublin, and qualified in 1900, winning the travelling surgical prize for that year. He studied for a short time under Kocher at Berne, and with H. H. Young at Johns Hopkins Hospital, Baltimore, and this period with Young coloured all his subsequent work. When he came back to Dublin as assistant surgeon at Sir Patrick Dun's Hospital, he took a special interest in genito-urinary disorders. His early communications to the section of surgery at the Royal Academy of Medicine in Ireland were in this field, as were his later papers to the medical journals. As a young surgeon, he had a strong physiological bent, and studied especially the physiology of micturition, making several reports to the academy on the internal sphincter mechanism of the bladder in dogs after prostatectomy. In 1904 he introduced Young's perineal prostatectomy, an operation which he practised with considerable success until his friend L. G. Gunn of the Adelaide Hospital converted him to the use of the Freyer suprapubic method. In 1908 he presented to the academy a case, the first of its sort in Ireland, of successful transplantation of both ureters into the rectum for ectopia vesicæ in a boy of 5. With these special interests he remained, however, a sound general surgeon, and in 1933 he was appointed to the regius chair.

Ball shunned the limelight. He was seldom seen at social functions, and found recreation mainly in gardening at his home in Carrickmines. His modesty deterred him from accepting honours that would otherwise have come his way. He particularly disliked speaking in public: at meetings his was always one of the last voices to be heard; but, when he did speak, he never failed to make a positive contribution to the discussion; and he earned a reputation as a settler of difficulties. Whatever the circumstances, he remained patient and imperturbable. To all he showed courtesy and kindliness. As an examiner, he openly supported the candidate; and many graduates of Trinity College will recall with gratitude his encouragement in moments of stress. On ward rounds he was considerate and attentive; those who entered the ward with him could see the welcome on the faces of his patients. He had a quiet sense of humour, and was the best of companions. Last summer he retired from his appointment as surgeon at Dun's Hospital, but he retained his chair, to which he had been re-elected in 1943, until his death.

Sir Arthur Ball married in 1907 Miss Elizabeth Wilson of Berkeley, California. They had no children, and the successor to the baronetcy is his brother, Mr. Nigel Gresley Ball, SC.D., formerly professor of botany at University College, Colombo.

CHARLES HORNE WARNER

M.D., B.SC. LOND., F.R.I.C., D.P.H.

Dr. C. H. Warner, who has died at his home in Southwell, Nottinghamshire, was born in 1883 of Quaker stock at Burlington, New Jersey, but came to England in infancy. He was educated at Sidcot School, Somerset, and became B.SC. Lond. in 1908 and later F.I.C. Subsequently he was appointed lecturer and member of the board of examiners at the Pharmaceutical Society, and during this period of his life he read a botanical paper to the Royal Society in 1914. Medicine attracted him, and he began to study it; but at the outbreak of the 1914–18 war he enlisted in the ranks, renouncing the pacifism of his forebears. He was recalled to finish his training at the Middlesex Hospital, and after qualifying in 1917 rejoined the Army in the R.A.M.C. Shortly afterwards, while serving with a front line unit, he submitted to the War Office a memorandum on defence against poison gas, and was soon employed in investigations on this subject. For a time he worked with Joseph Barcroft on Salisbury Plain, but in 1918 he went to Spain as a member of a commission investigating poison gas. A mistral which blew in one direction provided the required opportunity for the release of gas, which, as Warner was fond of saying, killed one sheep and was then dropped by the War Office. In 1919 he published a paper on an epidemic of ankylostomiasis in London. He took the D.P.H. in 1920 and his M.D. in 1921. During the recent war he put much energy into the organisation of A.R.P. casualty services and was an assistant director of medical services for Nottinghamshire. He had few hobbies, but he loved mountaineering, especially in France, Spain and Austria; though he was often invited to fish, a busy country practice left him little spare time.

"To the people of Southwell and the country miles around," writes a colleague, "Charles Warner gave devoted service. He had the gift of humility; injustice roused his anger, but his humility made him great. In his quiet and hesitant way he gave of himself to rich and poor alike, and in return his patients, who in the truest sense were his friends, gave not love but adoration. He asked not for thanks but for opportunity of service, and would have been greatly surprised at the affection in which he was held.

"Charles Warner was the perfect family physician, a good doctor with a flair for accurate diagnosis, held in great respect by his professional colleagues, who lived among his patients, who understood and loved their foibles, and who exhibited—not by discipline but by

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nature—a perfect tolerance of all their faults. To say that Warner was of the stuff of the tradition of medicine in its highest is perhaps trite in these days of superlatives, but it is true. When wider opportunities were opened to him he preferred a selfless service in an obscure village, and in doing so gave to his friends—medical and lay alike—an example on which they may well ponder all their lives.

"On New Year's day the great Norman nave of Southwell Minster was crowded with men and women, of all ranks of life, who wished to give thanks for a great life. The lesson from the 13th chapter of Corinthians, 'Charity suffereth long and is kind, charity envieth not, charity vaunteth not itself, is not puffed up . . .' was, to Warner's friends, poignant in its remembrance. Spontaneously, the young and old, the lame and the healthy, came to pay their last tribute to a man who, in the fullest understanding of Charity, had served them so well for so long."

Mrs. Warner is herself a medical practitioner, and his son, Dr. C. R. M. Warner, has lately succeeded him in the practice.

ALEXANDER SIMPSON-SMITH

M.CHIR. CAMB., F.R.C.S.

Lieut.-Colonel Simpson-Smith, who was previously reported missing, is now officially reported killed, and is buried at Halfaya-Sollum. He was captured at Tobruk on June 20, 1942, and when all casualties had been dealt with he escaped early in July. He got away in a motor-ambulance and was making for Siwa. It was reported that he was wearing a German officer's shirt, and this probably accounts for his having been shot, for he was never reported as a prisoner in any of the German camps.

Simpson-Smith was born in 1900. From Worksop School, Notts., where he was captain, he went to Cambridge and then to Guy's Hospital. He qualified M.R.C.S. in 1925, took his F.R.C.S. in 1929 and the M.CHIR. in 1930. In the same year he was appointed Richardson research scholar and studied at the Mayo Clinic and the Massachusetts General Hospital, and on his return as a research fellow of the Royal College of Surgeons he worked at Downe House on gastric ulcer.

After holding house-appointments at Guy's he was appointed a resident surgical officer and proved himself a brilliant and successful operator. He left Guy's when he became surgeon to the Hospital for Sick Children, Great Ormond Street; he was also on the staff of the Lord Mayor Treloar Cripples' Hospital, and the West London Hospital. A former secretary of the Medical Society of London he was also a member of the council of the Harveian Society.

Within a week or two of the declaration of war Simpson-Smith was gazetted as a major R.A.M.C. and was posted to a military hospital near London. But after the fall of France he did not rest till he was sent overseas. He served first at a base hospital near Cairo but later managed to get posted to Tobruk, where he remained till the town was captured, and he was mentioned in despatches for his work there. During the war years he had made a specialty of the treatment of burns and his death at the age of 42 cut short a surgical career of brilliant fulfilment and promise.

He married in 1939 Marguerite Alice, elder daughter of T. B. F. Davis of Jersey and Durban, South Africa.

H. L. E.

It is 3½ years since we heard that Simpson-Smith was missing after the fall of Tobruk. Now at last, after the smoke has cleared, his name is listed among the fallen; and now, as others return, his absence is most felt.

Everyone knew Simpson-Smith; his good looks and debonair charm were irresistible. Few realised his will to excel and capacity for hard work and self-criticism. There are some men to whom monotony and routine seem not to exist. Excitement, glamour, and variety surround them, and they sparkle. Simpson-Smith was one of these. In the operating-theatre his technique was superb, but he was always critical of his own and others' work. The ingenuity of the research scholar was constantly applied to routine surgery.

September, 1939, found him loved of the gods, equipped in physique, in personality, and by education, as few surgeons have ever been, for a great surgical career. He was in his stride; he loved the busy life; he knew the world he lived in. The loss of so stimulating a colleague and teacher is deeply felt at West London Hospital, for never greater than at present was the need for the enthusiastic spirit of attack which characterised Simpson-Smith.

G. B. W. W.

Appointments

BAUWENS, PHILIPPE, M.R.C.S.: temp. part-time physiotherapist, Royal Cancer Hospital (Free), London.
CHRISTIE, A. F. M., M.B. Lond.: temp. psychiatrist, Hampshire child guidance service.
DIMSDALE, HELEN, M.R.C.P.: temp. asst. physician, Elizabeth Garrett Anderson Hospital, London.
HARVEY, J. C., M.B. Lond., D.R.C.O.G.: temp. resident medical superintendent, Battle Hospital, Reading.
KINMONTH, M. H., M.B. Lond.: temp. R.S.O., Kingston County Hospital.
ROB, Wing-Commander C. G., M.B. Camb., F.R.C.S.: first asst., accident department, Radcliffe Infirmary, Oxford.
SIMPSON, ELEANORA, M.B. Edin.: temp. asst. M.O.H. for maternity and child welfare, Halifax.
WILL, MARGARET O., M.B. Aberd.: temp. asst. M.O.H. and R.M.O. at Municipal Maternity Hospital, Middlesbrough.

The following factory surgeons have been appointed:

COOK, P. N., M.B. Lond., Lyme Regis, Dorset.
HAYMAN, F. K., M.B. Lond., F.R.C.S., Rushden, Northants.
LANCELEY, H. S., M.B. Lpool, Hoylake, Cheshire.
MCLELLAN, MALCOLM, M.B. Glasg., Friockheim, Angus.
MILLAR, GORDON, M.R.C.S., Tottenham, Middlesex.
MOFFAT, W. J., B.A. Camb., M.R.C.S., Newcastle-under-Lyme, Staffs.
SHAW-CRISP, CUTHBERT, M.R.C.S., Lincoln, Lincs.
VARLEY, S. C., D.M. Oxfd, Harleston, Norfolk.
WARD, T. A., M.B. Belf., Week St. Mary, Cornwall.

Births, Marriages, and Deaths

BIRTHS

CAMPBELL.—On Jan. 3, in Edinburgh, the wife of Lieut.-Colonel I. D. Campbell, R.A.M.C., M.E.F.—a daughter.
ROBERTSON.—On Dec. 30, at South Nutfield, the wife of Dr. J. R. Robertson—a daughter.
ROBINSON.—On Nov. 21, at Bradford, the wife of Dr. G. A. Robinson—a daughter.
ROUTLEDGE.—On Jan. 3, at Haydon Bridge, Northumberland, the wife of Dr. L. R. Routledge—a son.
SCHOLEFIELD.—On Dec. 28, at Hereford, the wife of Mr. Bernard Scholefield, F.R.C.S.—a son.
TOWNSEND.—On Jan. 2, in London, the wife of Dr. R. F. Townsend—a daughter.
WILKIE.—On Jan. 2, at Cleveleys, the wife of Dr. Duncan Wilkie—a daughter.

MARRIAGES

ATTENBOROUGH—MANSBRIDGE.—On Dec. 26, at Peshawar, John Attenborough, M.B., captain R.A.M.C., to Frances Mansbridge, P.M.R.A.F.N.S.
SNALAM—BARKLEY SMITH.—On Dec. 29, at Maidenhead, Alfred Henry Snalam, M.B., of Shurlock Row, Berks, to Josephine Barkley Smith

DEATHS

BHORE.—On Dec. 30, at Bhopal, India, Margaret Bhore (née Stott), O.B.E., M.B. St. And., wife of Sir Joseph Bhore.
BRETT.—On Jan. 2, Percy Croad Brett, M.D. Lond., of West Heath Avenue, London, N.W.11.
BURRELL.—On Dec. 28, at Naunton, Glos., John Trevor Burrell, B.A. Camb., M.R.C.S.
DRAKE-BROCKMAN.—On Dec. 29, at Grand Vaux, Jersey, Herbert Edward Drake-Brockman, F.R.C.S.E., lieut.-colonel I.M.S. retd., aged 80.
FARR.—On Jan. 1, at Warwick Gardens, London, W.14, Joseph James William Farr, M.R.C.S.
MILLER.—On Dec. 30, at Brentwood, Edwin Swainson Miller, M.B. Vict., surgeon captain R.N.
PETERS.—On Dec. 30, at Petersfield, Albert Edward Duncan Ralph Peters, M.R.C.S., aged 82.
ROBINSON.—On Dec. 30, Valentine Charles Robinson, M.A., M.B. Camb., M.R.C.P.
WARNER.—On Dec. 29, at Southwell, Notts, Charles Horne Warner, M.D. Lond.

Major-General R. C. PRIEST, F.R.C.P., has been appointed house-governor of King Edward VII Convalescent Home for Officers at Osborne, Isle of Wight, in succession to Surgeon Rear-Admiral B. Pickering Pick, who has retired.

QUININE IN INDUCTION OF LABOUR.—Since 1942 it has been illegal to prescribe quinine except as an antimalarial drug and to prescribe quinidine except for the treatment of cardiac arrhythmias. Strict economy in cinchona products is still necessary, but the Ministry of Supply has now permitted the use of quinine for inducing labour.

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Notes and News

MEMORIAL TO NURSES AND MIDWIVES

A FUND is being launched to provide a memorial to the nurses and midwives of the British Empire who gave their lives in the war. A chapel has been allocated by the dean and chapter of Westminster Abbey, and the primary object is to furnish this chapel, which is to contain a roll of honour. For this purpose £5000 is required; but it is hoped that at least £50,000 will be raised, and the balance will be used for the benefit of the nursing and midwifery professions in a way to be decided later. A council of medical, nursing, and lay members has been formed to serve the fund, and this will later include representatives of the Dominions, the Colonies, and India. Medicine is represented on the council by Lord Moran, P.R.C.P., Sir Alfred Webb-Johnson, P.R.C.S., Mr. Eardley Holland, P.R.C.O.G., and Sir Comyns Berkeley, chairman of the Central Midwives' Board. The hon. secretary of the fund is Miss J. Elise Gordon, editor of the *Nursing Mirror*, by which all administrative expenses are being paid. Lloyds Bank are the trustees, and the fund's address is:—British Empire Nurses War Memorial Fund, Dorset House, Stamford Street, London, S.E.1.

TOWN AND GOWN COÖPERATE IN EDINBURGH

A JOINT committee of local authorities and voluntary organisations has recommended the appointment of a director of orthopædics for the Edinburgh area, who will also be reader in orthopædics in the university of Edinburgh. Of his salary of about £2000, the university will pay £962, and the rest will be contributed equally by local authorities and voluntary organisations.

The university has proposed that one of its chairs of medicine should be devoted entirely to teaching, treatment, and clinical research at the municipal hospitals. If this scheme is adopted, the Western General Hospital will need extensive development, including the addition of a follow-up department, a biochemical laboratory, and a lecture-room.

MR. BEVAN AND THE HEALTH SERVICE

Mr. Aneurin Bevan, Minister of Health, speaking last wee to a conference organised by the Council for Education and World Citizenship, said the Government's policy on health services was now well enough defined for him to start discussions with the organisations concerned. He hoped that before the end of the summer Parliament would pass a Bill for a health service which would put Britain ahead of all other countries: if the plan was to be complete and imaginative, too many concessions to conservative interests and points of view must be avoided. As to the great London hospitals, he did not propose to interfere but rather to lead them "into higher forms of service"; no institution or organisation would be allowed to block progress towards a State medical service. While it was proposed to revolutionise the hospital organisations, he recognised that a national service could be built up only over a period of years, and that the full coöperation of every citizen would be needed.

At a meeting of the Chartered Society of Physiotherapists on Jan. 5, Mr. Bevan gave an assurance that he did not propose to interfere with private practice: doctors could elect to remain outside the State service.

CIVIL NURSING RESERVE

THE Minister of Health has already announced that the Civil Nursing Reserve are to continue, and the Secretary of State for Scotland also intends that the Reserve in Scotland shall be maintained. New rates of pay and conditions of service are announced for members of both reserves. These include higher salaries for all members, payment for part-time service, and additional leave and travel facilities for certain classes.

In England and Wales trained nurses in charge of wards or departments are to receive £170 rising by £10 to £230; presumably these increments are to be annual, though the circular does not say so. The Scottish rates are the same, but the maximum of £230 is only to be achieved in the tenth year. Trained nurse in this context seems to mean a State-registered nurse, but nurses on the supplementary parts of the register are to receive the full scale only if they are holding sisters' posts in their own special branch of nursing. Trained nurses not in charge of wards or departments are to receive £130 rising by £10 to £170. The value of emoluments has been raised in both these groups—for the first group from £100 to £120, and for the second group from £90 to £100. Enrolled assistant nurses are to receive £100 rising by £5 to £130 with a further increase of £5 after another two years; emoluments are to be raised from £90 to £100. The pay of nursing auxiliaries is to be increased to £75 rising by £5 to £90, with emoluments worth £90 and annual leave extended to 28 days. Nurses working in tuberculosis institutions are to receive £10 yearly in addition to the above rates.

Regular part-time members of the reserve are to be paid for the first time; they must give an average of at least 16 hours' service a week. Whole-time mobile members of the reserve are to receive cheap travel passes for four journeys home a year.

The reserve is to be opened to members willing to serve in an emergency (Circular 230/45). They will be called upon in case of epidemics or of abnormal pressure on a hospital. The arrangements for such an emergency reserve are still under consideration, but meanwhile nurses willing to join it may enrol in the Civil Nursing Reserve in a special class of emergency members.

BOARDING-SCHOOLS FOR SUBNORMAL CHILDREN

MANY maladjusted and educationally subnormal children—probably some 15,000 at the present time—need places in residential special schools. Existing schools, however, cannot take more than 3000–4000 of them, and Miss Ellen Wilkinson, the Minister of Education, has asked local education authorities, despite the scarcity of building labour and teaching staff, to submit proposals for dealing with this shortage of accommodation (Circular 79, 1*d*.). Many of the children brought before the courts as delinquents or in need of care and protection are found to be educationally subnormal or maladjusted, and Miss Wilkinson feels that if their needs were ascertained earlier, and places found for them in residential special schools, large numbers of them would never come before the courts at all. It will not of course be possible to provide the entire number of places needed at the present time, but she hopes that authorities will do what they can by buying up large houses and adding prefabricated huts to existing schools. She will gladly consider proposals for providing these schools in advance of the full development plans of local education authorities.

University of Edinburgh

Courses for the diploma in public health, suspended during the war, are to be resumed in the spring term. In accordance with the new requirements of the General Medical Council (*Lancet*, Jan. 5, p. 36), there will be a preliminary course of three months which will give admission to a final course of six months.

Royal College of Surgeons of England

The Mayo Foundation has sent $5000 to the college's restoration and development fund. In his accompanying letter, Dr. Donald C. Balfour, director of the foundation, writes:

"We hope that this gift will be received as it is given, namely, as evidence of the desire of the staff of the clinic, particularly the surgical staff, to aid in the plans for the reconstruction of the buildings and facilities of the Royal College of Surgeons so that in this restoration the great influence of the college in elevating surgery and the surgical specialties will be continued in the future not only in the British Empire but throughout the world."

Royal Faculty of Physicians and Surgeons of Glasgow

Prof. Harry Platt will deliver the James Watson lecture in the hall of the faculty, 242, St. Vincent Street, Glasgow, on Wednesday, Jan. 23, at 4 P.M. He is to speak on Localised Cystic Lesions of Bone.

Lectures for Demobilised Doctors

Fellows of the Medical Society of London are giving a series of lectures on Tuesdays and Fridays beginning on Jan. 15 for any demobilised doctors who may wish to attend. The lectures will be held at 11, Chandos Place, London, W.1, and further particulars will be found in our Weekly Diary.

Joint Tuberculosis Council

The following officers have been nominated: chairman, Dr. D. P. Sutherland (senior tuberculosis officer, Manchester); vice-chairmen, Dr. Peter Edwards and Dr. George Jessel; hon. treasurer, Dr. A. P. Ford; hon. secretary, Dr. Norman England.

King Edward's Hospital Fund for London

The fund has received a further instalment of £125,000 from the Nuffield Trust for the Special Areas. In founding this trust Lord Nuffield provided that any loans repaid to it should pass to King Edward's Hospital Fund for London. In all £500,000 has now been received, the first £250,000 of which was, at Lord Nuffield's request, allocated to Guy's Hospital.

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Scandinavian Health Services

The Minister of Health has appointed a mission to visit Sweden and Denmark to study the latest developments in the administration of their public health services, particularly hospitals and health centres. The leader of the mission will be Captain Julian Snow, M.P., and the other members are: Major Donald Bruce, M.P., the minister's parliamentary private secretary; Dr. J. A. Charles, deputy chief medical officer of the ministry, and Mr. S. F. Wilkinson, a principal assistant secretary.

Housing in the United States

In a broadcast on Jan. 3 President Truman said that the U.S.A. urgently need about 5 million additional homes—new ones. This does not take account of the replacement of millions of existing substandard dwellings in the cities and on the farms. The greatest number of homes constructed in any one year before the war was less than a million.

Oxford Emergency Public Health Laboratory

This laboratory has moved to a new building in the grounds of the Radcliffe Infirmary, and communications should be addressed to Dr. R. Knox, the director, Public Health Laboratory, Walton Street, Oxford. The telephone numbers remain as before: Oxford 47884–5.

Resettlement of Army Nurses

The War Office has invited Miss Frances Goodall, general secretary of the Royal College of Nursing, to go overseas and speak to Army nurses on recent professional developments and resettlement prospects at home. The college has set up an advisory service to give information and guidance on resettlement.

Return to Practice

The Central Medical War Committee announces that the following have resumed civilian practice:

Dr. H. RICHARD DONALD, 24A, St. John Street, Manchester, 3.
Dr. H. GOLDSMITH, 4, Oxford Street, Nottingham.
Dr. DULCIE C. STAVELEY, 79, Portland Place, London, W.1.

Canadian Scholars

THE British Council have awarded postgraduate scholarships to 32 demobilised members of the Canadian Forces to enable them to study in Britain. The scholarships are for periods of 6–12 months, but some may be extended. The medical scholars include:

Captain R. W. BEGG, studying pathology at Lincoln College, Oxford.
Captain J. M. CORSTON, of Halifax, N.S., studying obstetrics and gynæcology at the Radcliffe Infirmary, Oxford.
Major C. HOLLENBERG, studying surgery at the University of Liverpool.
Captain G. HOMER, studying surgery at the Royal College of Surgeons of England.
Surgeon-Commander A. B. MCCARTEN, studying surgery at St. Bartholomew's Hospital, London.
Captain W. H. ROSE, studying cardiology at the British Postgraduate Medical School, London.
Major F. R. TUCKER, studying orthopædic surgery at the University of Liverpool.

Order of St. John of Jerusalem

THE KING has sanctioned the following promotions in, and appointments to, this order:

As Knights.—John Newman Morris, C.M.G., M.B., Colonel Wilfred Vickers, D.S.O., M.B., Colonel Walter Woodworth White, M.D., Colonel John Ralph Donaldson, M.B., Lieut.-General James Bennett Hance, C.I.E., O.B.E., K.H.S., I.M.S.

As Associate Knight.—Major-General Paul Ramsey Hawley, U.S.A.M.C.

As Commanders.—Major William Norman West-Watson, M.D., Eric Hoerman, M.B., Kenneth Fraser Lund, M.B., Alfred George Timbrell-Fisher, M.C., F.R.C.S., James Herbert Graham Robertson, C.B.E., F.R.C.S.E., Major-General Ronald Herbert Candy, C.I.E., K.H.S., I.M.S., Joseph Welsh Park Harkness, C.M.G., O.B.E., M.B., Major-General William Clavering Hartgill, C.B., O.B.E., M.C., M.R.C.S., Thomas William Meagher, M.B.

As Officers.—Major John Forrest Hamilton, M.D., Oscar Theodore John Christensen de Hegartier Clayre, M.R.C.S., Surgeon Commander William Arthur Hopkins, O.B.E., M.D., William Horner Pallett, M.B., Joseph Peter Lowe, M.B., William Murray, M.D., Charles Russell Corfield, M.D., Lieut.-Colonel Spencer Hunt, M.B., Edmund Ralph Weaver-Adams, M.B., John Philip Prell, M.R.C.S., Thomas Blackadder Gilchrist, M.D., Alexander Juett, B.M., Reginald Dalton McKellar-Hall, M.D., F.R.C.S., Douglas Duncan McCowan, M.B., Harold Whitfield Ward, M.B., John Ridgway Hanna, M.B., William Burton Fox, M.B., Harold Ettrick Moore, M.B., Basil Thomas Parsons-Smith, M.D., F.R.C.P., William Edward Rutledge, L.R.C.P.E., Surgeon-Commander Harold Keith Corkill, O.B.E., R.N.Z.N., Charles George Morice, M.D., F.R.C.S., Armand Rioux, M.D., Lieut.-Colonel Edward Howard Wood, M.B., Major Stanley Hamilton Calnek, R.C.A.M.C., Colonel William Elliot Randal Dimond, C.I.E., O.B.E., I.M.S., Lieut.-Colonel Patrick Arthur Dargan, I.M.S., Henry John Shone, M.B., Hilda Marion Davis, M.D.

Medical Diary

Jan. 13 to 19

Monday

MEDICAL SOCIETY OF LONDON, 11, Chandos Street, W.1.
8 P.M. Pathological meeting.

Tuesday

UNIVERSITY OF LONDON
5.15 P.M. (University College, Gower Street, W.C.1) Mr. F. Bergel, PH.D.: Survey of the Field of Pharmacotherapeutics. (First of five lectures.)
ROYAL SOCIETY OF MEDICINE, 1 Wimpole Street, London, W.1.
5.30 P.M. General meeting of fellows.
MEDICAL SOCIETY OF LONDON
5.30 P.M. Mr. V. Zachary Cope: The Acute Abdomen. (Lectures for demobilised medical officers.)
EUGENICS SOCIETY
5.30 P.M. (rooms of Royal Society, Burlington House, W.1) Dr. Eliot Slater: Assortative Mating. Mrs. Moya Woodside: Courtship and Mating in an Urban Community.
SOCIETY FOR THE STUDY OF INEBRIETY
4 P.M. (at 11, Chandos Street, W.1) Dr. H. J. Pullar-Strecker: Treatment of Alcoholism by Insulin.

Wednesday

ROYAL SOCIETY OF ARTS, John Adam Street, W.C.2.
1.45 P.M. Sir Jack Drummond, F.R.S.: Famine Conditions and Malnutrition in Europe.
RESEARCH BOARD FOR CORRELATION OF MEDICAL SCIENCE AND PHYSICAL EDUCATION
2.30 P.M. (21, Albemarle Street, W.1) Sir Alfred Webb-Johnson, P.R.C.S., Mr. Aneurin Bevan, M.P., Air-Marshal Sir Harold Whittingham, F.R.C.P., Sir Reginald Watson-Jones, F.R.C.S., Brigadier F. A. E. Crew, F.R.S.: annual general meeting.

Thursday

ROYAL COLLEGE OF SURGEONS, Lincoln's Inn Fields, W.C.2.
5 P.M., Major P. W. Clarkson, F.R.C.S.: Treatment of Face and Jaw Casualties in British Army. (Hunterian lecture.)
ROYAL SOCIETY OF MEDICINE
3.30 P.M. *Dermatology.* Demonstration of photography as applied to dermatology. 4 P.M. Dr. A. C. Roxburgh, Flight-Lieutenant H. Mandiwall, Dr. Brian Stanford, Dr. F. A. E. Silcock: Photography in relation to Dermatology.
ROYAL SOCIETY OF TROPICAL MEDICINE AND HYGIENE, 26, Portland Place, W.1.
8 P.M. Dr. E. R. Cullinan: Medical Disorders in East Africa.
BRITISH INSTITUTE OF RADIOLOGY, 32, Welbeck Street, W.1.
8 P.M., Prof. H. T. Flint, D.SC.: Development of Ultra-short Waves.

Friday

ROYAL SOCIETY OF MEDICINE
8 P.M. *Obstetrics and Gynæcology.* Dr. Robert Cruickshank and Mr. James Wyatt: Bacteræmia of Puerperal Sepsis.
8 P.M. *Radiology.* Dr. J. Blair Hartley: Tomography in Diagnosis of Lung Cancer. Dr. R. A. Kemp Harper: Radiology of the Pancreas. Dr. A. S. Johnstone: Experimental Study of the Vertebral Venous System.
FACULTY OF RADIOLOGISTS
2.30 P.M. *Therapy* (at the Royal College of Surgeons). Dr. S. Bryan Adams, Dr. Ifan Ap Thomas, Dr. J. F. Bromley, Mr. C. J. L. Thurgar, Dr. W. Shanks, Mr. J. Jackson Richmond, Mr. A. J. Durden Smith: Treatment of Birthmarks, Keloids, and Warts.
TUBERCULOSIS ASSOCIATION
5 P.M. (26, Portland Place, W.1) Dr. Norman Tattersall: The Tuberculosis Service and the Future (presidential address). Dr. Jethro Gough: Pathological Changes in the Pneumoconiosis of Coal-miners.
8 P.M. Dr. Enid Rogers: Incidence of Tuberculosis in the Pneumoconiosis of Coal-miners.

INFECTIOUS DISEASE IN ENGLAND AND WALES

WEEK ENDED DEC. 29

Notifications.—Infectious disease: smallpox, 0; scarlet fever, 1376; whooping-cough, 724; diphtheria, 514; paratyphoid, 5; typhoid, 9; measles (excluding rubella), 565; pneumonia (primary or influenzal), 1118; cerebrospinal fever, 38; poliomyelitis, 25; polio-encephalitis, 1; encephalitis lethargica, 2; dysentery, 265; ophthalmia neonatorum, 50. No case of cholera or typhus was notified during the week.

The number of service and civilian sick in the Infectious Hospitals of the London County Council on Dec. 26 was 1085. During the previous week the following cases were admitted: scarlet fever, 60; diphtheria, 33; measles, 13; whooping-cough, 19.

Deaths.—In 126 great towns there were no deaths from measles, 2 (0) from enteric fevers, 1 (0) from scarlet fever, 10 (2) from whooping-cough, 9 (0) from diphtheria, 55 (8) from diarrhœa and enteritis under two years, and 72 (9) from influenza. Figures in parentheses are those for London.

Leeds and Birmingham each reported 1 death from an enteric fever. Liverpool had 10 deaths from influenza, Birmingham 6. There were 6 fatal cases of diarrhœa and enteritis at Liverpool.

The number of stillbirths notified during the week was 205 (corresponding to a rate of 40 per thousand total births), including 21 in London.

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BREAD *

R. A. McCANCE
M.D., Ph.D. Camb., F.R.C.P.
PROFESSOR OF EXPERIMENTAL MEDICINE IN THE UNIVERSITY OF CAMBRIDGE

EXCEPT for a few isolated people, such as the Eskimos and the Masai, who are almost entirely carnivorous, man relies largely on cereals to furnish himself and his domestic animals with food. Climatic and economic conditions largely determine whether wheat, rice, maize, oats, barley, rye, or millet shall be grown, but precedent and practice are also important factors, especially in primitive and semi-primitive agricultural communities such as those of India and Africa. Before the recent war wheat and maize were produced in roughly equal amounts, and smaller but still enormous quantities of rice, oats, rye, and barley were harvested. All of them can be ground into flour and made into palatable cakes or porridge, but wheat is the only one which will bake good bread.

"Wheat is the farinaceous food most generally used by the better sort of people over the whole of Europe, excepting the very northern parts in which it cannot be produced; but even there it is imported for the use of persons of condition. It has this advantage, that it can be formed into a more perfect kind of bread than any other of the Cerealia . . ." (Cullen 1789). The reason for this is that the proteins of wheat have special physico-chemical properties. Because of these the flour can be made into an elastic dough which entangles the bubbles of gas liberated by the yeast or raising agent and produces a porous, firm, and upstanding loaf. Hence wheat has become the cereal of choice for bread-making and human nutrition. It will grow in temperate climates in most parts of the world. It was cultivated in Egypt in Pharaoh's time and is harvested now extensively in the United States, Canada, Argentine, Australia, Europe, Russia, Egypt, and parts of India.

The fact that wheat bakes the best bread does not necessarily mean that it contains more nutrients than any of the other cereals. Each has its own characteristics and uses. Oats, for example, contain more fat than any of the other grains and have a high proportion of protein. They are a good cereal nutritionally, but they have a greater tendency than the other cereals to produce rickets. They are eaten as porridge and oat-cakes in this country, but the bulk of the oatmeal produced here at home goes to feed the animals. Barley is the cereal of choice for the brewing industry and is also used extensively in animal nutrition. Rye will grow on very poor soils, and the bread made from it is eaten extensively in Denmark, Germany, Scandinavia, and parts of Russia. Maize is the staple cereal for human consumption in parts of the Southern States of America, Africa, and Europe. It is used in the manufacture of some of the native beers. It is a poor cereal nutritionally, and its geographical distribution is associated with that of endemic pellagra. It is, however, a valuable animal food and probably the cheapest of all cereals to produce. Rice is the great cereal of the East for human consumption, but it is also used in Japan for brewing, and the milling by-products are valuable animal foods (Kent-Jones 1939).

STRUCTURE AND COMPOSITION OF WHEAT GRAIN

Botanically the wheat grain is a seed, and it has an elaborate structural and chemical organisation adapting it for the work of reproducing its kind. Fig. 1 shows its structure diagrammatically. Starting from the outside there are several layers of hardened covering cells, and underlying them the aleurone layer, which is a highly specialised envelope of cells rich in protein. Then comes the endosperm, which for structural, chemical, and milling purposes must be divided into the outer and the inner endosperm. The "germ" is situated at one end of the seed and is a tiny structure, divisible, however, into the scutellum and the embryo, which are functionally and chemically quite distinct. The scutellum separates the embryo proper from the main mass of the seed, the whole of which breaks down on germination to furnish the embryo with the material it requires for its early growth.

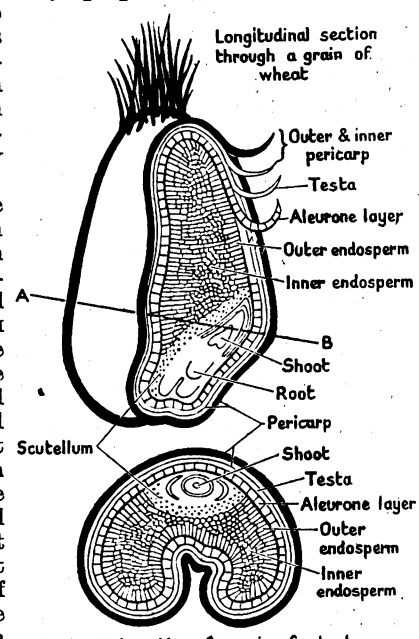

Fig. 1.—Structure of the wheat grain.

These separate parts of the grain have not all been subjected to a complete chemical analysis, but table I shows some of the facts which have been compiled about them, and table II the amount which each of them contributes to the weight of the total grain.† A glance at table I shows that the inner parts of the endosperm are much poorer in protein, minerals, and vitamins than are the outer layers. The amounts of phosphorus and aneurine (vitamin B_1) in the scutellum are really remarkable. One cannot help wondering whether these substances are not metabolically as well as anatomically associated; the variable proportions of inorganic and phytic-acid phosphorus in the different parts of the grain are a challenge to the experimental ability of the plant physiologists (McCance and Widdowson 1945).

THE BAKERS AND THE PUBLIC

The public, who eat the bread, demand certain characteristics in the loaves they buy. They prefer them white rather than brown, and they like them to have a big volume and uniform texture, to cut and to keep well. The bakers from long experience know the kind of flour which will bake such loaves. It has what they call "strength." By this each baker really means a flour which will give a fine big loaf by the process he happens to use for preparing the dough. Exactly what is meant by this term scientifically it would be very difficult to say (Kent-Jones 1939), but certain facts are known and recognised on every hand. Some wheats, for example, give a much stronger flour than others, and in general the higher the protein the greater the strength. Canadian-grown wheat, which may contain 14% of protein, gives a characteristically strong flour, English wheat with 8–10% of protein in it a characteristically weak one. The difference is due more to climatic conditions than to anything else, but the species of wheat is also a factor. "Yeoman" wheat, for example, is stronger than most other English varieties. Wheats grown in other parts of the world tend to have intermediate qualities.

For obvious economic reasons most of the wheat-

* Finlayson Memorial Lecture, delivered to the Royal Faculty of Physicians and Surgeons of Glasgow, Jan. 9, 1946.

† Much of this fine chemical work and other information about the newer aspects of milling has come from the Cereals Research Station, St. Albans.

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TABLE I—COMPOSITION OF THE WHOLE-WHEAT GRAIN, THE ENDOSPERM, AND THE GERM

Component	Whole wheat	Endosperm		Germ	
		Central portions	Outer layers	Embryo	Scutellum
Protein (%)	8·9	8·1	14·6	33	29
Fat (%)	2·2	0·7	..	15	30
Carbohydrate (%) ..	66·8	75·8	..	..	..
Phosphorus (mg. per 100 g.)	311	59	1017	1160	1900
Phytate phosphorus (mg. per 100 g.)	213	8	874	400	1300
Iron (mg. per 100 g.) ..	3·0	0·5	12	9	..
Vitamin B_1 (I.U. per g.)	1.6	0·1	1·8	3	60
Riboflavine (g. per g.) ..	1·5	0·4	1·8	15	..
Nicotinic acid (g. per g.)	42	5	184	60	..

producing countries have to eat their own wheat, and this to some extent dictates the type of bread and farinaceous articles they will produce (Irons 1936). Macaroni, for example, is almost the national emblem of Italy, although "Durum" wheat, from which it is made, is now grown extensively in America. We also must consume our own wheat, but we do not produce nearly enough for our own requirements, and hence we must import enormous quantities. This enables us to select from the world wheats those most suited for our purposes and our palates and to blend wheats to meet every demand. Thus most of the Canadian wheat we import goes into bread, and much of the weak English wheat is used in the biscuit trade, for which it is eminently suitable.

It is the endosperm which imparts strength to the flour, and a mixture of bran and germ weakens the flour for baking purposes. It is almost impossible to get brown flour to rise and set so well as white flour made from the same wheat. Thus both appearance and baking qualities have led bakers from time immemorial to remove as much of the bran as possible from the ground grain. The Romans had four or five grades of flour, and the most expensive contained the least bran, and there are many references in the Bible to fine flour: ("And thou shalt take fine flour, and bake twelve cakes thereof; . . ." *Leviticus*, xxiv, 5). The classical method of effecting this separation was by hand sieving ("I will sift the house of Israel among all nations, like as corn is sifted in a sieve, . . ." *Amos*, ix, 9). This technique for removing the coarse particles of bran continued

TABLE II—COMPONENT PARTS OF THE WHEAT GRAIN AS PERCENTAGES OF THE WHOLE

Component part	Percentage by weight of whole wheat
Bran { lignified outer layers ..	4·0
Bran { aleurone layer	8·3
Endosperm { excluding outer layers	83·0
Endosperm { outer layers	2·0
Germ { embryo	1·2
Germ { scutellum	1·5
Total	100·0

almost unchanged for many centuries, but nowadays the whole process has become part of the milling industry and is carried out at the big roller mills.

For reasons which we do not yet understand weakness in flour is accentuated by the presence of reducing substances. These may be –SH groupings in the flour proteins (Jacquot and Guillemet 1944, Bailey 1944). At all events, adding cystein to a strong flour converts it instantaneously into a very weak one. If flour is left in contact with air, these reducing groups are slowly oxidised, and the flour becomes stronger. The process can be greatly accelerated by oxidising agents, and these are the basis of the "improvers" which the millers use and to which some nutritional experts have taken so much exception.

THE MILLERS' POINT OF VIEW

In the primitive communities the miller and the baker were no doubt one and the same person, and "milling" consisted in pounding or grinding the grain, as it does still in many parts of the world. But when first water and then wind were harnessed to turn the millstones, the era of specialisation had begun. The fundamental changes in the milling processes, however, took place with the introduction of roller mills in the 19th century. With a roller mill at his command the miller could separate the endosperm pretty well completely from the outer coats, aleurone layer, and bran. This pleased the bakers and the public, and the millers were very glad to please them, because the requirements of the country were the same whether the public were given a white flour representing 70% of the original grain, or wholemeal flour. According to the millers, indeed, people eat more white flour than brown. But to supply white flour, even in equal quantities, meant a larger turnover of wheat at the mill and provided by-products which

TABLE III—COMPOSITION OF ENGLISH AND MANITOBA WHEATS AND OF FLOURS MILLED FROM THEM

—	(g./100 g.)				(mg./100 g.)			(μg./g.)	
	Protein	Fat	Carbohydrate	Fibre	K	Ca	Fe	Riboflavine	Nicotinic acid
Whole wheat Manitoba ..	13·62	2·49	63·0	2·15	312	27·6	3·81	1·7	55·0
English	8·89	2·23	66·8	2·08	361	35·5	3·05	1·7	48·0
Flour—									
85% extraction (English)	8·55	1·46	72·0	0·42	179	24·5	2·22	1·2	10·5
80% extraction (English)	8·21	1·28	73·5	0·19	151	21·5	1·65	0·8	9·0
75% extraction (English)	7·98	1·13	74·2	0·15	118	19·2	1·35	0·6	8·0
70% extraction (English)	7·92	1·04	74·5	tr.	111	18·9	1·40	0·6	7·5
46% extraction (English)	7·64	0·76	75·8	tr.	99	15·2	0·95	0·5	5·0

The milling behaviour of the Manitoba wheat is so similar to that of the English (see fig. 2), that the details of it have been omitted. Full details will be found in the original publication (McCance, R. A., Widdowson, E. M., Moran, T., Pringle, W. J. S., Macrae, T. F. *Biochem. J.* 1945, **39**, 213.)

the miller was able to dispose of at remunerative prices to the animal husbandmen. Economically, everything was set fair and remained so until physiologists and shipping shortages began to intervene.

NUTRITIONAL VALUE OF WHEAT AND WHEAT FLOURS

The figures given in table I show that many substances of proven nutritional value are congregated in the outer endosperm and germ. Furthermore, bran, for which no figures are given in the table, seems to contain nearly as much nicotinic acid as does the outer endosperm (Moran 1945); and the aleurone layer, which separates with the bran, is said to contain 25% of protein and 9% of fat (Jacquot and Guillemet 1944). These facts provide clear chemical evidence of the nutritional value of the outer parts of the grain. Indeed, the inner endosperm looks poor stuff nutritionally, and its poverty is enhanced by the fact that its protein is known to contain an unbalanced and incomplete mixture of amino-acids.

Experience and experiments with animals fully bear out this chemical evidence. Breeders have always thought highly of the weatings or wheat offals and have been prepared to pay high prices for them as feeding-stuffs for cattle, poultry, and pigs. Many experiments have demonstrated their value as a source of vitamins,

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and the mixed proteins of whole wheat have been shown to provide a much better growth mixture for rats than those of white flour (Chick 1942).

Table III shows what happens to the composition of flours as the extractions rates are lowered, and fig. 2 shows graphically the changes in some of the important constituents. These changes are due to the gradual removal of the bran, outer endosperm, and germ. By 85% extraction most of the bran (fibre) has gone, and this has led to the big fall in minerals, but most of the germ and scutellum have been retained, with some of the outer endosperm. This has prevented any serious fall in aneurine and has held up the concentration of iron and other vitamins. A big fall in aneurine occurs as the extraction falls from 85% to 75%, because it is between these two extractions that the germ and scutellum are removed. In spite of the high concentrations of protein in the germ, aleurone layer, and outer endosperm, these constitute a relatively small proportion of the total grain; hence the 70% flour contains little less protein than whole wheat. Nutritionally, however, the quality is much lower. It should be noted in passing that there is very little calcium in wheat.

TABLE IV—NITROGEN ABSORBED PER 100 G. OF NITROGEN EATEN

Extraction-rate of flour	As English wheat containing 8·32% protein	As Manitoba wheat containing 13·51% protein
80%	83·4	90·9
90%	80·0	87·2

Bran is laxative and stimulates the intestinal glands to produce more secretions. It has been recognised for many years that bran in small quantities is partially digested, but that tolerance varies (Brull et al. 1945). Its inclusion in the flour used for baking lowers the utilisable calories of the bread, so that raising the extraction-rate indefinitely is not all pure gain. Fig. 3 shows this and that up to 85% the rate of utilisation does not fall off much. The big fall takes place between 85% and 100%.

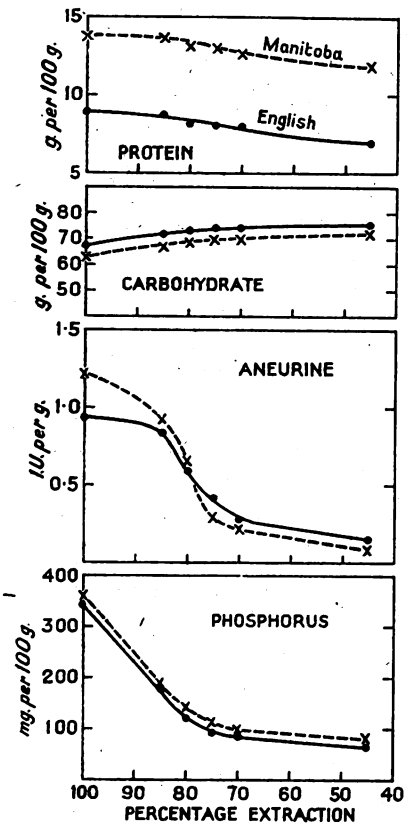

Fig 2—Effect of milling on the composition of wheat: Manitoba and English flour compared.

Many people have found that increasing the extraction-rate lowers the apparent digestibility of wheat protein. We have recently confirmed this once more (table IV) but we have added further information. First, the apparent digestibility of wheat protein rises with the amount of protein in the wheat. Secondly, with extraction-rates up to 90% practically all the protein in the fæces is derived from the intestinal glands and not from the wheat. This is indicated by table V, which shows that the nitrogen excreted in the fæces depends on the amount of flour eaten and the extraction-rate of that flour but not on the amount of nitrogen in it. If any of the wheat nitrogen was undigested and unabsorbed, one would expect to find that increasing the amount of nitrogen eaten increased the amount excreted. Hence a moderate increase in the amount of bran in the bread lowers the apparent digestibility of wheat proteins by increasing the intestinal secretions rather than by the addition of indigestible protein. Similar experiments with whole-meal flour have still to be carried out and may show that the additional bran causes so much more intestinal hurry that its protein is not all digested. These results with wheat, moreover, must not be taken necessarily to apply to other cereals, for the addition of the outer parts of their grains to their refined flours decreases the apparent digestibility of their calories and protein much more than similar additions of wheat bran (Jacquot and Guillemet 1944).

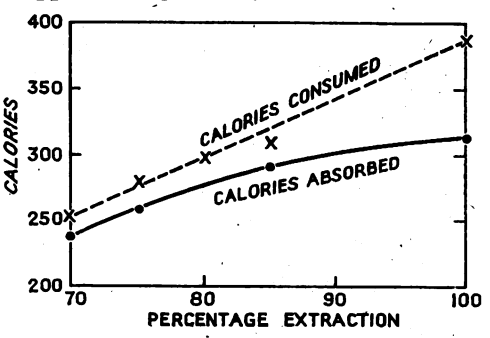

Fig. 3—Calorific value of the flour consumed and of the parts of it available for physiological purposes per 100 g. of wheat milled.

It was found in the early years of the recent war that there was one nutritional disadvantage about raising the extraction-rate. It leads to the inclusion of more and more phytic acid in the flour. This substance, inositolhexaphosphoric acid, precipitates calcium in the intestine and by so doing prevents its absorption (McCance and Widdowson 1942, Hoff-Jørgensen 1944). The effects might be much greater were it not for the fact that the flours also contain an enzyme, phytase, which hydrolyses the phytic acid during the making and raising of the dough (Widdowson 1941, Pringle and Moran 1942). Oatmeal contains very little of this enzyme (McCance and Widdowson 1944, Schulerud 1944), and it is thought that this is why it is so much more rachitogenic than wheat or rye (Mellanby 1925). The presence of phytic acid in the outer parts of the grain might have been a serious argument against raising the extraction-rate, had the people who made this discovery not also shown that the bad effects of phytic acid could be entirely prevented by adding calcium to the bread (McCance and Widdowson 1942).

TABLE V—NITROGEN IN THE FOOD AND IN THE FÆCES PER 1000 G. OF FLOUR EATEN

—	Nitrogen in—	
	food (g.)	fæces (g.)
As Manitoba 90% extraction	126	1·73
As English 90% extraction ..	84	1·68
As Manitoba 80% extraction	130	1·19
As English 80% extraction ..	82	1·36

Since the war ended, contact has been re-established with the Danish scientists, and it appears that they have also been working on this subject during the past few years. A commission was appointed to go into the matter, and Dr. E. Hoff-Jørgensen was placed in charge of a great part of the work. Our results have been confirmed at all points, and the Danes have reached conclusions which in many cases are identical with ours, but they have gone a little farther in two respects. They have found that

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lactic acid specifically catalyses the enzyme phytase, and they have considered making use of this accelerating effect to remove the phytic acid from rye breads. They have also carried out balance experiments with children (in this country the work was all done on adults), and they have shown that phytic acid has a most deleterious effect on their calcium absorptions. This is a most valuable extension of the work carried out in this country (Lundsgaard, personal communication).

EFFECT OF THE WAR

A shortage of shipping in the 1914–18 war forced the Government to take control and to introduce brown bread for general use. About 92% of the grain of wheat went into the flour in 1917–18, and only the coarsest particles of bran were excluded. Potato starch and other cereals were added from time to time, and the product was the cause of a good deal of discontent. It was obvious in 1939 that there was likely to be a shortage of shipping before very long, and in an experimental study of rationing which we carried out at that time we assumed that such would be the case, and we provided the experimental party with bread made from wheat flour of 92% extraction (McCance and Widdowson 1946). We did not spoil this good flour by adding other cereals, but we did add precipitated chalk. This was done because our rations of milk and cheese were so small that we might have suffered from a deficiency of calcium. We did not appreciate at that time the important part that the phytic acid in the brown bread might play in our calcium metabolism. We only found this out later, but it was this experiment which gave us our clue, for the calcium absorptions from our experimental rations were unexpectedly and unexplainedly low.

As the war went on, the shortage of shipping made it necessary to reduce imports very drastically. More English wheat was grown, but by 1940–41 it was clear that the extraction-rate would have to be raised, as it had been in the last war. The only question was to what extent it should be raised. Much depended on a wise decision. There were several points of view to be considered and reconciled. The public and the bakers wanted the whitest loaf possible for the reasons already given, and the need for including more and more English wheat in the grists made their request a reasonable one. The physiologists were convinced and had been for many years that raising the extraction-rate would improve the nation's health, but they were uncertain to what extent the inclusion of bran would be beneficial. The animal breeders were in desperation for feeding-stuffs; and unless the nation was in extremis it seemed reasonable to reserve the coarsest parts of the bran for animals, which make much better use of this foodstuff than does man.

Considerations such as these led the Accessory Food Factors Committee of the Lister Institute and the Medical Research Council to recommend the Government to adopt an 85% flour and to fortify it with calcium (Medical Research Council 1941). It was felt that such an extraction was an immense nutritional improvement on the old 70% loaf, that the nation was assured of its B vitamins, a good protein mixture, and additional iron, and that the risk of a calcium deficiency had been foreseen and steps taken to prevent it. The Government, faced by the shipping situation, accepted the 85% recommendation, halved the suggested amount of calcium, introduced the National Loaf, and popularised it by making the most of its nutritional advantages. A sense of responsibility for the nation's health was rapidly developing at that time, but it is a reflection on democratic methods of government that it should have required a shortage of shipping and a crisis like that of 1940–42 to effect what must be regarded as a major nutritional reform.

There can be no question that this loaf was the right thing at the right time, and the benefits attributed to it may be taken as a measure of its success. Thus, the reduction in anæmia which has been detected in Edinburgh has been held to be due to the iron which it introduced to "everyman's" food; the reduction in the sale of laxatives to its residual traces of bran; its success in invalid nutrition, particularly in ulcerative conditions of the gastro-intestinal tract, to the fact that so much bran had been eliminated! The last two of these claims have always seemed to me somewhat contradictory, and I have never felt very happy about the first. I had anticipated that the phytic acid in the 85% flour would counterbalance the additional iron by precipitating it in the intestine (Widdowson and McCance 1942, McCance et al. 1943). Nevertheless I am convinced that the public owes some of their good health during a very trying time to the bread with which they were provided.

RECENT DEVELOPMENTS

Towards the end of 1944 the Government suddenly announced that it proposed to reduce the extraction-rate for wheat to 82½% and shortly afterwards to 80%. This move, which seemed to many to have been made at a most inopportune moment, revealed an unstable policy on the part of the Government and aroused a feeling of insecurity among the people who were anxious to see national health come first. A debate was held in the House of Lords on the subject on Feb. 28, 1945. Many of the speakers made mistakes about their facts, but the Government found it difficult to justify its actions. A second debate was introduced by Lord Hankey on Oct. 24, 1945 (*Hansard* 1945). He moved "That the health of the population should be the guiding principle to govern the nutritional policy of the Government, and that in applying that principle to the case of bread the health of the consumer should be the primary factor, and milling and other interests should be developed in harmony with this policy"; and the motion was accepted. In this debate some of the conclusions of a conference which had been convened by the Government on the post-war loaf were revealed by Lord Horder and Lord Llewellin (*Hansard* 1945), and the report of this conference has now been published (Ministry of Food 1945).

It appears to have been recognised that flour must in future conform to certain nutritional standards, and it is implied that these shall be of the order of those contained in flours of 80–85% extraction. I have discussed the nutrient value of flours of various extractions and shown how these tend to fall as the extraction is lowered; hence it might be supposed that this step would be equivalent to fixing the extraction-rate at an optimal nutritional level. But this is not quite the case. The bakers are still, I have no doubt, pressing for a white loaf and urging the millers to supply them with one. When the extraction-rate was 85%, the millers had no option but to extract every possible particle of flour and germ from the wheat. The nutritional value of the flour was assured. But with the fall to 80% the miller has two alternatives. In spite of the Government controls, which entail an elaborate system of weighing, he may mill to give a flour of optimal nutritional value or he may mill to give a flour more pleasing to his customer, the baker. The millers must make their living, and if they do not do their best to please their bakers they can see these same bakers buying low-extraction flour in America and Canada as soon as the restrictions are removed and dispensing with their services altogether.

The millers would like to be allowed to mill to low extraction as they did before the war and to add minerals and synthetic vitamins to the flour to bring it up to specification. This is now the practice in America, so there is precedent for it; it would pander to popular taste, and would have a sense of cleverness and mastery

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about it which would have a cheap newspaper appeal. A surprising reason for permitting the addition of synthetic vitamins was brought out by the conference on the post-war loaf (Ministry of Food 1945). It seems that the members of the technical subcommittee knew of no simple yet infallible test by which the extraction-rate of flour could be measured, and thereby enforced, after the present Government control was allowed to lapse. It was felt, therefore, that it would be useless to try to insist that the "token" nutrients, such as iron and aneurine, in the flour should come from the wheat itself and not from the chemist's laboratory. This seems very strange, for, although it might be very difficult to distinguish between natural and synthetic vitamins once they had been added to flour, it should surely not be beyond the wit of man to devise a test by which the extraction of flour could be judged with sufficient accuracy to ensure that any given sample was of 83–86% extraction.

Everything that we know about biology and nutrition is opposed to the practice of artificial enrichment, for man can only put back what he knows he has taken out. He would be a very bold miller who offered to replace all the valuable amino-acids, minerals, and vitamins in the outer parts of a grain of wheat. "It must be recognised that synthetic vitamins and vitamin concentrates are expedients that cannot form the basis for a sound nutrition programme. In the last analysis, good nutrition must be built upon a foundation of an optimum diet of natural foodstuffs" (Boudreau 1945).

WHAT'S TO DO ABOUT IT?

The increase in our knowledge of nutrition, coupled with the growing sense of responsibility which Governments feel in matters of public health, is bringing this problem to the fore in many countries. As already mentioned, the Americans have chosen to fortify 70% flour with minerals and vitamins; the Canadians have forbidden enrichment and are pushing "Canada approved" flour, which is about 78% extraction and rich in aneurine; the Dutch, I hear, have not yet decided between the rival claims of high extraction and fortification, and I do not know yet what is being done in other countries.

If the health of the people really is the first consideration in our bread policy, the cheapest, safest, and easiest way to maintain this is to keep up the extraction-rate of the flour used for bread-making. Speaking personally—i.e., nutritionally—I would like to see 85% flour and the "National" loaf reintroduced. The nutritional case for such action has been admirably put by Lepkovsky (1944), whose article contains also a reasoned and informative review of the whole of the so-called bread "problem." If this were done as a long-term policy, milling techniques would be improved and adapted in conformity, and this would lead to a betterment in the 85% flours. Calcium should be added to neutralise the bad effects of phytic acid.

I recognise that there are difficulties about 85% flour. One is its keeping qualities, which are not so good as those of 70% flour. Lord Llewellin made this point in the debate in the House of Lords. Now there are, I believe, two aspects of this. One is that the 85% flour goes "off" on keeping because the fat in the germ becomes rancid. This may be a trouble in the Navy but should not be so in civilian practice in this country. Another is that the baked loaves go mouldy quicker than loaves made from 70% flour. This may be a matter of the moisture content, but it may well be a sign of nutritional quality, for these moulds are very discriminating little creatures and will only grow on the very best media. They much prefer, therefore, an 85% to an 80% or 70% loaf.

The millers will always be in a difficulty with long-extraction flours, so long as the public has a free choice of loaf and remains more interested in football pools than positive health; but although I hate bureaucratic control I do not feel that these difficulties are insuperable. A good test for the extraction-rate of flour would be a help. Much could be done by frankly and honestly putting the case for its own health before the public. If we revert to a flour of 70% extraction, it will be much more difficult and much more expensive on purses and imports to ensure that Mr. Tom, Mrs. Dick, and Master Harry get their supplies of nutritional minutiæ, and I personally would not care to undertake to do it.

REFERENCES

Bailey, C. H. (1944) Constituents of Wheat and Wheat Products, N.Y.
Boudreau, Dr. (1945) Quoted by Lord Horder. See *Hansard* (1945), **137**, 464.
Brull, L., Dubois, L., Op de Beech, M. J. (1945) Etude sur l'assimilation des constituants de pain intégral et du son. Les états de carence en Belgique pendant l'occupation allemande 1940–1944, Liége, p. 181.
Chick, H. (1942) *Lancet*, i, 405.
Cullen, W. (1789) A Treatise of the Materia Medica, Edinburgh.
Hansard (1945) **137**, 448.
Hoff-Jørgensen, E. (1944) *K. danske vidensk. Selsk. mat. fys. Meddelelser*, **21**, No. 7.
Irons, J. R. (1936) Breadcraft, Watford.
Jacquot, R., Guillemet, R. (1944) *Rec. Inst. nat. Hyg.* tome I, vol. III, p. 177.
Kent-Jones, D. W. (1939) Modern Cereal Chemistry, Liverpool.
Lepkovsky, S. (1944) *Physiol. Rev.* **24**, 239.
McCance, R. A., Edgecombe, C. N., Widdowson, E. M. (1943) *Lancet*, ii, 126.
— Widdowson, E. M. (1942) *J. Physiol.* **101**, 44, 304; (1944) *Nature, Lond.* **153**, 650; (1945) *Proc. nutrit. Soc.* in press; (1946) *Spec. Rep. Ser. med. Res. Coun., Lond.* No. 255.
Medical Research Council (1941) see *Lancet*, i, 703.
Mellanby, E. (1925) *Spec. Rep. Ser. med. Res. Coun., Lond.* No. 93.
Ministry of Food (1945) Report of Conference on Post-War Loaf.
Moran, T. (1945) *Nature, Lond.* **155**, 205.
Pringle, W. J. S., Moran, T. (1942) *J. Soc. chem. Ind., Lond.* **61**, 108.
Schulerud, A. (1944) *Acta physiol. scand.* **8**, 259.
Widdowson, E. M. (1941) *Nature, Lond.* **148**, 219.
— McCance, R. A. (1942) *Lancet*, i, 588.

SYNERGIC ACTION OF PENICILLIN AND SULPHATHIAZOLE ON BACTERIUM TYPHOSUM

JOSEPH W. BIGGER
M.D., Sc.D. Dubl., F.R.C.P., F.R.C.P.I.
PROFESSOR OF BACTERIOLOGY AND PREVENTIVE MEDICINE, UNIVERSITY OF DUBLIN
From the School of Pathology, Trinity College, Dublin

IT is generally considered that the typhoid bacillus is resistant both to penicillin and to sulphonamides, but since little precise information on the subject has been published it was considered worth while to investigate the effect of the two separately and in combination.

Eight strains of *Bacterium typhosum* were used: one of each of the phage types A, C, and G; two of each of the phage types E_1 and F_1; and one O strain devoid of Vi antigen. Both plain meat infusion broth and the same medium treated by the method of Harper and Cawston (1945) were used. Tests were made in tubes containing 5 c.cm. of plain or treated broth in which were incorporated the requisite amounts of sulphathiazole, of penicillin (Pfizer), or of both. Broths were inoculated by adding to a tube one loopful of a 24-hour broth culture or of a decimal dilution of it in broth. Since this is a rather inexact method of measurement, the number of typhoid bacilli stated to have been added must be regarded as a mere approximation.

The penicillinase used was that present in a Seitz-filtered 10-day broth culture of one of Harper's paracolon bacilli (Harper 1943).

EXPERIMENT 1

One strain of *Bact. typhosum* (phage type E_1) was inoculated into plain and treated broths with and without sulphathiazole (10 mg. per 100 c.cm.). The number of *Bact. typhosum* introduced varied between 700,000 and 7 per c.cm.

After incubation for 48 hours it was found that sulphathiazole, in the concentration used, somewhat reduced the turbidity produced in plain broth, but that definite turbidity was produced even when the inoculum was as low as 7 bacilli per c.cm. In treated broth containing 10 mg. of sulphathiazole per 100 c.cm. almost full turbidity was produced when the inoculum was 700,000 per

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TABLE I—BROTHS AFTER 48 HOURS' INCUBATION
(Original number of bacilli added, 700,000 per c.cm.)

No.	Penicillin (units per c.cm.)	Sulphathiazole (mg. per 100 c.cm.)	Phage type of *Bact. typhosum*							
			A	C	E_1	E_1	F_1	F_1	G	O
1	8	0	+	+	+	+	+	+	+	+
2	4	0	+	+	+	++	+	++	+	+
3	2	0	+	++	++	+++	+	++	+	+
4	1	0	++	++	+++	+++	+	++	++	+
5	0	0	+++	+++	+++	+++	+++	+++	+++	+++
6	8	10	−	−	−	−	−	−	−	−
7	4	10	−	−	−	−	−	−	−	−
8	2	10	+	+	±	±	−	±	−	−
9	1	10	+	+	+	±	+	+	+	±
10	0	10	++	++	++	++	+	++	++	++

−, broth clear. ±, +, ++, +++, increasing degrees of turbidity.

c.cm., but greatly reduced turbidity was produced when the inoculum was 70,000 or 7000 per c.cm. When the inoculum was 700 per c.cm. or less the broth remained clear after incubation for 48 hours, although, as shown by subculture, the typhoid bacilli introduced were not killed.

EXPERIMENT 2

The eight strains of *Bact. typhosum* were tested in treated broth containing sulphathiazole (10 mg. per 100 c.cm.), penicillin (from 8 to 1 units per c.cm.) or both. The inoculum was approximately 700,000 bacilli per c.cm.

The results after 48 hours' incubation are given in table I. Inhibition of growth, as judged by the broths remaining clear, was not obtained with penicillin alone or sulphathiazole alone in the concentrations tested but was obtained by the combination of penicillin (8, 4, and in some cases 2 units per c.cm.) and sulphathiazole (10 mg. per 100 c.cm.).

To determine whether the bacilli present had been killed, the broths were incubated for a further 48 hours (96 hours in all). One loopful of each broth which had remained clear was then inoculated on an agar slope; this was incubated, and the broth tube, after the addition of a further 5 c.cm. of broth containing penicillinase and *p*-aminobenzoic acid, was incubated for five days.

The test imposed on the combination of penicillin and sulphathiazole—to attempt to kill 700,000 *Bact. typhosum* per c.cm. in 96 hours—was a severe one, but nevertheless it was found that, in broths containing 8 units of penicillin per c.cm. and 10 mg. of sulphathiazole per 100 c.cm., complete sterility had been attained with four strains and almost complete sterility (no growth from one loopful but growth from 5 c.cm.) with two strains, while with the remaining two strains the number of bacilli surviving was greatly reduced. Complete sterility was not produced with any strain by 4 units of penicillin per c.cm. and 10 mg. of sulphathiazole per 100 c.cm. although the number of surviving bacilli had been greatly reduced with several of them, as it also had in some cases by the combination of 2 units of penicillin per c.cm. and sulphathiazole.

The susceptibility of different strains of typhoid bacilli to the combination of penicillin and sulphathiazole varies, but the number of strains tested was too small to determine if their susceptibility depended on their phage type. The only strain devoid of Vi antigen showed about average susceptibility.

EXPERIMENT 3

Tubes of treated broth containing various combinations of penicillin and sulphathiazole were inoculated with decreasing numbers of typhoid bacilli (phage type F_1) and incubated for 48 hours, when the results shown in table II were obtained.

The broths were incubated for a further 48 hours (96 hours in all) when they were tested for the presence of living typhoid bacilli by inoculating one loopful on agar, and by further incubation after the addition of broth containing penicillinase and *p*-aminobenzoic acid.

Complete sterility was produced in 96 hours by 20 and 10 mg. of sulphathiazole per 100 c.cm. but not by 5 mg. acting alone on *Bact. typhosum* when the number of bacilli in the inoculum was 7 per c.cm. Sterility was not produced by sulphathiazole alone in any concentration tested when the number of *Bact. typhosum* was 70 or more per c.cm. Penicillin (4 units per c.cm.) in combination with sulphathiazole produced "one-loop sterility" but not complete sterility when acting on 700,000 *Bact. typhosum* per c.cm. The same combination sterilised 70,000 *Bact. typhosum* per c.cm., and as little as 1 unit per c.cm. with sulphathiazole sterilised 7000 *Bact. typhosum* per c.cm.

TABLE II—BROTHS AFTER 48 HOURS' INCUBATION

Sulphathiazole (mg. per 100 c.cm.)		20	10	5	10	10	10
Penicillin (units per c.cm.) ..		0	0	0	4	2	1
No. of *Bact. typhosum* originally present per c.cm.	700,000 ..	+	+	+	−	−	+
	70,000 ..	+	+	+	−	−	±
	7000 ..	±	±	±	−	−	−
	700 ..	−	−	−	−	−	−
	70 ..	−	−	−	−	−	−
	7 ..	−	−	−	−	−	−

− = Clear. ±, + = Increasing degrees of turbidity.

It should be realised that penicillin deteriorates in broth at 37° C., and that the initial concentration mentioned in the experiments was not maintained for the whole period of 96 hours. A solution of penicillin in broth was kept at 37° C. for 45 hours, as a result of which its strength fell from 4 units to 2·5 units per c.cm.

DISCUSSION

The experiments recorded demonstrate that the combination of penicillin and sulphathiazole in a nutrient medium kills large numbers of typhoid bacilli. This further example of synergism of penicillin and a sulphonamide shows that sulphonamides differ from some bacteriostatic substances, such as boric acid (Bigger 1944) and helvolic acid (Chain and Duthie 1945), which interfere with the bactericidal action of penicillin.

The action of sulphathiazole on *Bact. typhosum* appears to be mainly bacteriostatic; only with very small numbers of bacilli could a bactericidal effect be demonstrated.

The object of this investigation was to discover if chemotherapy could be used in the treatment of typhoid fever. There is no reason to doubt that, by the simultaneous administration of the two drugs, typhoid bacilli would be killed in vivo as they are in vitro. The questions of practical importance are: can a sufficiently high concentration of penicillin be maintained for a sufficient time in the human body to kill all the typhoid bacilli

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present in it, and, if not, what would be the effect of killing large numbers of the bacilli without achieving complete sterility?

The concentration of sulphathiazole used in the experiments (10 mg. per 100 c.cm.) is one which can be maintained in the body. With this support the concentration of penicillin required to kill all the typhoid bacilli present depended mainly on their numbers. A concentration of 1 unit per c.cm. sufficed to sterilise 7000 typhoid bacilli per c.cm., and one of 4 units per c.cm. sterilised 70,000 per c.cm. We are here dealing with much higher concentrations of penicillin than are generally employed in treatment, but it seems certain that, with sufficient dosage of penicillin and optimum methods of application, a concentration of 2 or more units per c.cm. in the blood and tissue fluids could be maintained for as long as required. Such a concentration should be ample to kill the typhoid bacilli in the blood in the bacteræmic stage of the disease, but whether it would suffice for the probably more densely populated lymph-nodes, spleen, and liver is a matter of speculation since we know little of the numbers of bacilli present in these organs. Our aim should be to sterilise the body vis à vis typhoid bacilli, but if this concentration failed to sterilise it should certainly prevent multiplication of the bacilli in the body. We might thus hold the invaders in check until antibodies had developed in sufficient amount to deliver the coup de grâce, or we might further assist nature by the administration of antibacterial serum.

There is always a considerable element of hazard in applying the discoveries of the laboratory to the human patient, and it is only by attempting the treatment suggested that we can discover if theory can be applied to practice. A prima-facie case for the trial has been made. We can say with considerable confidence that, if the treatment does not benefit the typhoid patient, it is very unlikely to harm him.

My tentative suggestions as regards treatment are:

1. Commence treatment as soon as the diagnosis has been established.
2. Administer sulphathiazole regularly in full doses and simultaneously penicillin, preferably by continuous application, at the rate of 2½ to 3 million units a day, which should maintain a concentration of over 2 units per c.cm. in the serum.
3. Continue the treatment for at least 5 and preferably for 7 days. During this period pyrexia is to be expected from the release of toxic substances by the bacilli which have been killed and have undergone lysis.
4. Stop both treatments at the same time, and observe the patient for any evidence of the continued presence in the body of typhoid bacilli. If such should occur, resume treatment and continue for a further 4 days.
5. Control the effects of treatment by frequent blood and fæces cultures, using for the former broth containing *p*-aminobenzoic acid and penicillinase.

SUMMARY

Using broth freed from sulphonamide-antagonising substances by the method of Harper and Cawston, sulphathiazole was found to inhibit the growth of *Bact. typhosum* to a considerable extent. It had some bactericidal effect, but only on a small inoculum.

Penicillin in concentrations up to 8 units per c.cm. reduced but did not prevent the growth of *Bact. typhosum* in broth.

The combination of penicillin and sulphathiazole had a pronounced bactericidal effect on *Bact. typhosum*. Penicillin (4 units per c.cm.) with sulphathiazole (10 mg. per 100 c.cm.) sterilised broth containing 70,000 *Bact. typhosum* per c.cm. Penicillin (1 unit per c.cm.) with sulphathiazole (10 mg. per 100 c.cm) sterilised broth containing 7000 *Bact. typhosum* per c.cm.

Suggestions are made for the treatment of typhoid fever by penicillin and sulphathiazole.

I am grateful to Mr. A. Felix, D.SC., F.R.S., for supplying me with cultures and typing phages and for typing one strain, and to my assistants and technicians for their help.

REFERENCES

Bigger, J. W. (1944) *Lancet*, ii, 497.
Chain, E., Duthie, E. S. (1945) *Ibid*, i, 652.
Harper, G. J. (1943) *Ibid*, ii, 569.
— Cawston, W. C. (1945) *J. Path. Bact.* 57, 37.

HYPERVENTILATION ASTHMA

HERBERT HERXHEIMER
L.R.C.P.E.
From the E.M.S. Rehabilitation Unit, Stanboroughs Hospital, Watford

BRONCHIAL asthma is a syndrome rather than a disease and can be brought on by allergic factors outside the patient (extrinsic), or within the patient (intrinsic), or both. The intrinsic may be metabolic (endocrine), psychological ("nervous asthma"), infection (acute bronchitis), or primary emphysema. In all cases bronchial spasm followed by asthma is elicited very easily, and in many patients, once the syndrome has been established, the spasm can be elicited by various "trigger" factors, not only allergic but also of different origin.

It seems to be certain that this disposition to bronchial spasm can be present from birth—many children develop asthma very early—but there is an important group of intrinsic asthma where the syndrome develops only at the age of about 40, thus suggesting that it is acquired. Even in these cases the tendency may have been present from birth—the gun may have been loaded, to use the metaphor of Rackemann (1938), but the trigger has not been pressed till late, when a suitable trigger factor developed. One of these trigger mechanisms to which little attention seems to have been paid is hyperventilation and in some cases hyperventilation seems to be the only cause of the asthma.

It is difficult to estimate in what proportion of cases of asthma hyperventilation through excitement or muscular exercise acts as a releasing mechanism. In many cases voluntary hyperventilation has no such effect, and in others muscular exercise is well tolerated. In some of them voluntary hyperventilation even seems to be beneficial.

METHOD OF INVESTIGATION

The following six cases of hyperventilation asthma were selected from 19 consecutive patients with bronchial asthma who were investigated clinically and experimentally. All patients but one (case 4) were under ward observation for at least some weeks. The respiration was in all cases graphically recorded with a spirometer of the Benedict type, as used for estimating the basal metabolic rate. The vital capacity and its subdivisions were determined in the same way. Muscular exercise consisted of short runs of 2–4 min. Immediately after the run the subject hurried back to the spirometer. Between the end of the run and the beginning of the recording of the respiration during recovery usually half a minute was lost. All these determinations were carried out in a sitting position, which is why the respiratory volume (R.V.) is slightly higher than under basal conditions. CO_2 hyperventilation was carried out with a wide rebreathing-tube of corrugated rubber. The length of this tube was varied to obtain a R.V. comparable with the volume reached in voluntary hyperventilation. Before each experiment the chest was auscultated, to exclude patients with rhonchi. A wheeze was said to be present if the patient felt it and at the same time rhonchi could be heard on auscultation. It is considered that this wheeze is the first definite clinical sign of bronchospasm and therefore marks the beginning of the asthma attack. To illustrate the normal reaction to hyperventilation and to a short sharp run, two such experiments have been carried out with a normal subject (figs. 1 and 2).

CASE-RECORDS

CASE 1.—A girl, aged 15, admitted under Dr. Andrew Morland, had had asthma attacks since the age of 2 years. Tonsils were removed at 2 years. Attacks equally frequent in winter and summer, more numerous during the last 2 years, now every 4–6 weeks. Some of the attacks developed after cycling long distances (not after cycling 2 miles to school) or after playing hockey. When she was expected to go to a party her mother never told her beforehand, as she would otherwise have an attack before going. On examination, including radiography, nothing abnormal was detected (N.A.D.) in the chest and internal organs.

Skin Tests: no positive reaction. *Differential White-cell Count*: 9% eosinophils on admission; 3 weeks later 5·5%.

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Respiration.—In rest, the R.V. was usually increased, being 13·0–26·0 litres per min. (l./min.). The respiration was very irregular. Vital capacity usually about 4000 c.cm., subdivisions normal (fig. 3).

Exercise.—Cycling for 1 min. did not lead to any abnormal reaction. Running: a sharp run of 2 min. led to a heavy increase in respiration; 2 min. after the end of the run a slight wheeze developed. The vital capacity did not decrease, but the reserve air increased during this period from 36% to 43% (normal limits 20%–41%). The wheeze disappeared after 5 min. After a run of only 1 min. 20 sec. a short and transient wheeze appeared in the 6th min. (fig. 4).

Hyperventilation.—Voluntary hyperventilation of 48–64 l./min. for 2–3 min. caused during the last minute a feeling of tightness in the chest and immediately afterwards a wheeze with bronchitic rhonchi. At the same time tension round the mouth and pins-and-needles in hands and feet developed. The wheeze became gradually worse, and the vital capacity decreased from 3900 c.cm. in steps to 3260 c.cm., whereas the reserve air increased from 34% to 54%. This slight asthma attack lasted 15 min. and had eventually to be stopped with ephedrine inhalation (fig. 3).

This reaction was the same after ammonium chloride 1·0 g. t.d.s. had been given for 3 days previously. If, however, alkaline powder (sod. cit. 5 g., pot. cit. 1·5 g., sod. bicarb. 3·5 g., 1 teaspoonful q.d.s.) was given for 3 days previously, the asthma attack was transient. No signs of tetany were seen then, the wheeze lasted only 2 min. and disappeared without any need of ephedrine, and no decrease of the vital capacity was observed in one experiment. In another, however, the vital capacity decreased from 3870 c.cm. to 3620 c.cm., and the reserve air increased from 32% to 42%. When hyperventilation was carried out with CO_2 through a rebreathing-tube, R.V. was increased to 41 l./min. for 6 min. in one experiment, and to 37 l./min. for 5 min. in another. In neither of these was any sign of wheeze, asthma, or tetany seen. After hyperventilation, whether induced voluntarily or with CO_2, the respiration never decreased to a short period of apnœa, as would be expected normally; it returned to its former latent hyperpnœa.

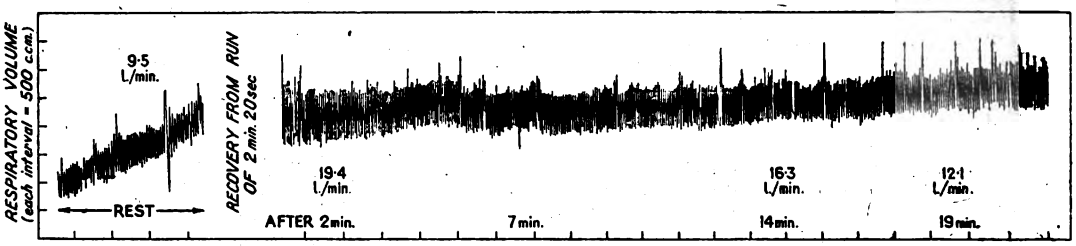

Fig. 2—Normal subject. Recovery from sharp run. After 19 min. respiration has almost returned to normal.

The history suggests that two factors acted as triggers producing the asthma; hyperventilation (caused by excitement) and heavy muscular exertion. The first is made probable by the fact that voluntary hyperventilation in normal conditions provokes tetany, indicating an increase of the blood pH. Both asthma and tetany can be prevented if hyperventilation is produced by CO_2 breathing—i.e., if the excess removal of CO_2 from the blood with its consequence for the blood pH is prevented. If bicarbonate base is given before voluntary hyperventilation, the asthma attack cannot be prevented but is much shorter and less severe.

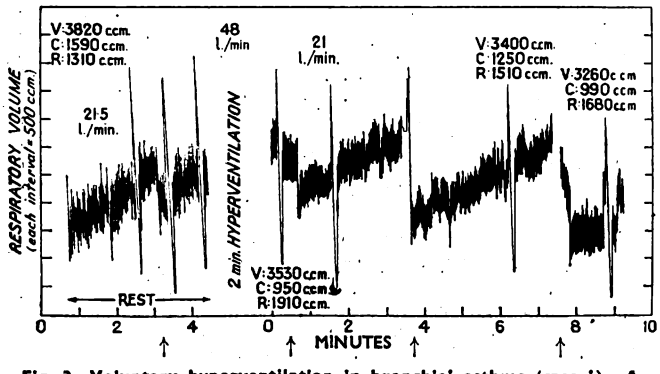

Fig. 3—Voluntary hyperventilation in bronchial asthma (case 1). A wheeze appears towards the end of the 2-min. period of hyperventilation and continues during the whole recovery, increasing in strength until ephedrine inhalation is given to stop the asthmatic attack. The vital capacity (V) decreases from 3820 c.cm. to 3260 c.cm., and the percentage of reserve air (R) increases. Note that the patient is already hyperventilating at rest, and that after the voluntary hyperventilation there is no period of relative apnœa (C = complemental air.)

↑ Spirometer refilled.

CASE 2.—A woman, aged 34, admitted under Dr. Morland. No serious disease in the past. The first attack of asthma occurred 18 months before admission. On this occasion she was out in the evening at a party and nearly missed the last bus home. She had to run fast and far to catch it, and the attack developed in the bus and lasted all night, needing medical attention. Frequent attacks since, often after excitement—e.g., after laughing. For 5 months after discharge from hospital patient remained free from attacks, apart from a short spell of asthma following a febrile cold in the head. Chest radiography and internal organs: N.A.D.

Skin Tests not carried out. *Differential White-cell Count*: 1·5% eosinophils.

Respiration.—Breathing was always irregular, with an inclination to spontaneous hyperventilation. Vital capacity was on admission 2420 c.cm., with normal subdivisions, and increased under graduated physical exercise to 3210 c.cm.

Exercise.—Short and heavy exercise (cycling for 1 min.) did not provoke an attack; prolonged exercise was not tried.

Hyperventilation.—Voluntary hyperventilation for 2 min. led to a feeling of tightness in the chest, and ½ min. later to an audible wheeze and bronchitic rhonchi. This condition lasted 20 min. Other experiments with hyperventilation were not attempted.

In this case again the history suggests that muscular exercise and hyperventilation constitute trigger mechanisms. Infective catarrh of the air passages is another trigger. For hyperventilation this mechanism has been proved by experiment.

CASE 3.—A woman, aged 28, admitted under Dr. Kenneth Harris. Had rheumatic fever in 1928. During this illness mitral stenosis and auricular fibrillation developed; the latter is controlled with small doses of digitalis. She had been in hospital 14 times since, mostly because of attacks of bronchitis or bronchial asthma. From time to time she had palpitations which caused a feeling of anxiety and breathlessness. Subsequently asthmatic wheezes sometimes developed. Sexual intercourse very often led to long and severe asthma attacks. There have been several attacks of urticaria. Slow auricular fibrillation. Radiography showed slight congestion of lung vessels; enlargement of the heart, especially of left auricle.

Skin Tests.—Positive reaction against many different proteins. *Differential White-cell Count*: 1·5% eosinophils.

Respiration.—Regular. The curve shows a slight tendency to hyperpnœa as often seen in patients with chronic venous congestion. The vital capacity was definitely reduced by about 15%. The R.V. in rest was 10·0–15·0 l./min.

Hyperventilation.—Voluntary hyperventilation for 2–3 min. led to a slight but typical asthma attack, lasting 5 min. in one experiment and, with interruptions, 7 min. in another. During these attacks the vital capacity was reduced from 1990 c.cm. to 1760 c.cm. and from 2070 c.cm. to 1920 c.cm. respectively. The reserve air increased from 32% to 38% and from 38% to 45% respectively. In the second experiment the wheeze tended to disappear after 3 min. but could be brought back by a few very deep respirations. The attacks disappeared spontaneously, and the respiration then returned to a more normal level than before (7·9 and 11·7 l./min.). Hyperventilation with CO_2 (26 l./min. for 7 min.) produced no asthma attack.

In this case the main trigger mechanism seems to be febrile infection of the air-passages, which, supported by the chronic venous congestion of the lungs, leads quickly to febrile bronchitis. Apart from that, numerous foreign proteins and excitement seem to be causal, the

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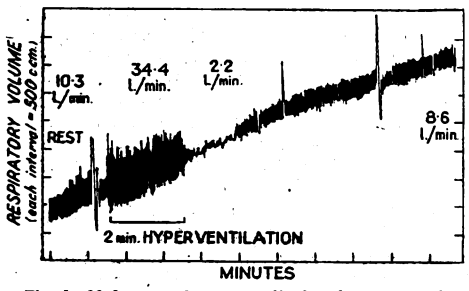

Fig. 1—Voluntary hyperventilation in a normal subject. Immediately after hyperventilation the respiration approaches apnœa.

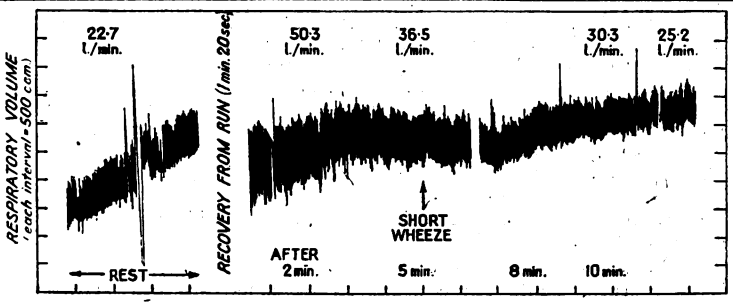

Fig. 4—Bronchial asthma (case 1). Recovery from very short run. Even after this very short exercise the respiration is more than doubled, and it takes 12 min. to return to near the resting value. In this case the exercise was not strong enough to produce a real asthmatic attack, but a short wheeze appeared during the 6th min., lasting about 2 min.

latter probably by producing hyperventilation, which has been proved to provoke an asthma attack. In this case, as in case 1, only hyperventilation connected with loss of excess CO_2 caused an attack; CO_2 hyperventilation was without this effect.

CASE 4.—A boy, aged 14, had had his first attacks of asthma at the age of 9, after eating habitually a large number of eggs. At the same time urticaria developed. The attacks used to come on during that time also after a cold in the head. When after a year the eggs were restricted to 2 a week, the asthma ceased completely. Now for about a year he had noticed that a typical wheeze came on when he ran hard for 50–100 yards; the wheeze lasted then for about ½ hr. After a cross-country run it might last the whole day. It never developed during the run but a few minutes afterwards. Sporadic asthma attacks came on after inhaling SO_2 or, more slightly, after inhaling other fumes, such as N_2O_4, in the chemical laboratory. Internal organs: N.A.D.

Skin Tests not carried out. *Differential White-cell Count*: 4% eosinophils.

Respiration.—Tendency to be irregular, sometimes gross hyperpnœa, especially if attention was not diverted. R.V. at rest 12–14 l./min. Vital capacity normal, with normal subdivisions.

Exercise.—Sharp runs of 2 min. produced with great regularity (5 experiments) a slight but typical asthma attack. This developed only 2–5 min. after the run and lasted 2–3 min. The vital capacity during the wheeze fell, in one typical experiment, from 2960 c.cm. to 2520 c.cm. The percentage of reserve air did not change. Normal vital capacity was reached 8 min. after the run, but hyperpnœa continued for a long time after the asthma attack had ceased.

Doses of alkaline powder and of ammonium chloride during the days preceding the exercise had no clear effect. The wheeze was sometimes shorter, sometimes longer, without definite relation to the substance given. The only means of suppressing the attack was to connect the patient immediately after the run with a CO_2 rebreathing-tube. If he breathed through this tube for 6 min. and the tube was then shortened gradually during the next 4 min. and eventually taken off, no attack came on.

Hyperventilation.—Voluntary hyperventilation for 3 min. produced a short wheeze lasting only 1 min. CO_2 hyperventilation did not cause any wheeze.

In this case the trigger mechanisms were some proteins (eggs), local irritants (various kinds of gases), febrile bronchitis, muscular exercise, and high degrees of hyperventilation.

CASE 5.—A boy, aged 15, admitted under Dr. Morland. No serious illness apart from asthma attacks since early childhood. Once or twice such attacks came on after football. Once he noted that, when he was involved in a prolonged argument at work, his chest felt tight, as if an attack would develop, but it did not. Internal organs and radiography of chest: N.A.D.

Skin Tests.—Mixed inhalants gave a strongly positive reaction; other inhalants a positive; eggs and milk a positive. *Differential White-cell Count*: eosinophils 4%.

Respiration.—Often irregular with a tendency to hyperventilate. R.V. in rest 10·0–11·2 l./min. Vital capacity normal; subdivisions normal.

Exercise.—After a sharp run of 2 min. no asthma attack developed but the respiration remained very high for a long time: 36·3 l. in the 2nd min., 40·7 l. in the 4th, 38·0 l. in the 6th. In the 12th min. it was 27·2 l. (whereas normally it should be near the normal 10–12 min. after this kind of exercise) and even after 19 min. it was much higher than normal (fig. 5).

After a longer run of 4½ min. a wheeze was observed after 1 min., and a full asthma attack developed subsequently, with the vital capacity going down from 3145 c.cm. to 1720 c.cm. Ephedrine had to be given to stop the attack. If a long rebreathing-tube was given immediately after the end of the run, no wheeze and no attack developed in one experiment; in another experiment rhonchi could be heard 5 min. after the run, and they lasted 1–2 min. The patient, however, did not feel any wheeze or any tightness. No stronger attack developed.

Hyperventilation.—Voluntary hyperventilation caused a short and transient wheeze (1–2 min.) only during the 4th min. Immediately afterwards there was a short period of hypopnœa (4·7 l./min.). This is a normal reaction, although in a normal person the hypopnœa would be more pronounced. CO_2 hyperventilation (25 l./min. for 7 min. and 39 l./min. for 8 min.) did not cause any wheeze.

The trigger mechanisms here seem to be foreign proteins, hyperventilation, and exercise. This could be shown for hyperventilation and for exercise only in prolonged experiments. The development of the asthma attack could be prevented by CO_2 breathing.

CASE 6.—A boy, aged 12, admitted under Dr. Morland. No serious illness. Asthma attacks for 7 years. Attacks first developed mainly during febrile bronchitis. No attacks during the last 2 weeks while in hospital. Often wheezy after running. Before his admission to hospital he had attacks of asthma every morning between 5 A.M. and 8 A.M., especially when he slept in the air-raid shelter. He is an only child, and the mother seems to have been frightened by the air-raids. Internal organs and radiography of chest: N.A.D.

Skin Tests negative. *Differential White-cell Count*: 3% eosinophils.

Respiration.—Fairly regular; no tendency to overbreathe (resting R.V. 9·0–13·0 l./min.). Vital capacity normal; subdivisions normal.

Exercise.—Sharp run of 2 min. produced no attack but a very prolonged and excessive ventilation: R.V. 27·0 l. in the 2nd

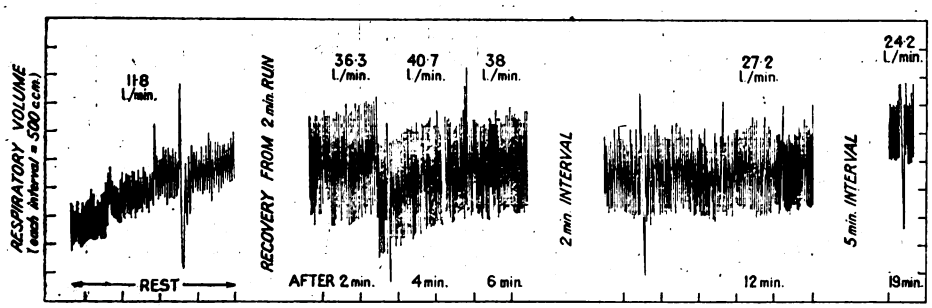

Fig. 5—Bronchial asthma (case 5). Recovery from short sharp run. The respiratory volume increases to an abnormally high value (if compared with a normal subject in fig. 2) and remains at more than double the resting value even after 19 min., whereas the normal subject has, at this time, almost returned to his basal level: excessive ventilation after exercise.

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min., and 19·0 l. in the 9th min. After 12 min. recovery of the respiration was not yet complete. The vital capacity was slightly reduced during this period, from 2550 c.cm. to 2180 c.cm. Sharp run of 4 min. 12 sec. had a similar but more pronounced effect on the respiration, which remained extremely high for more than 15 min. The vital capacity decreased to 1830 c.cm. and the reserve air increased from 33% to 43%. A typical wheeze developed in the 6th min. of recovery and lasted 14 min.

Hyperventilation.—Voluntary hyperventilation did not produce asthma.

In this case exercise has been shown to be one of the trigger factors, while there seem to be other factors still unknown.

DISCUSSION

It appears from these cases that hyperventilation plays a distinct part in provoking asthma. In all but one (case 6) it has been possible to cause a slight or moderate asthma attack by voluntary hyperventilation. The question is now, which of the effects of hyperventilation is the direct cause. The increased respiratory movements and the increased flow of air can be excluded; we have caused similar changes of ventilation by CO_2 hyperventilation without producing asthma. There remain as factors the reduced acidity and the loss of CO_2 by the body. It did not appear necessary to prove that after hyperventilation an actual loss of CO_2 and an increase in pH took place. These experiments have been carried out so often by others that this change can be regarded as an established fact. Further, case 1 developed typical symptoms of tetany during hyperventilation, and the others at least showed the beginning of these symptoms: dizziness and sometimes very slight pins-and-needles.

Most of those patients (4 out of 5) in whom hyperventilation provoked an attack showed a typical history. They had noticed that after prolonged excitement (expectation of a thrilling event, laughter, prolonged argument, sexual intercourse) an attack developed. This suggests that the excitement caused hyperventilation, which in turn brought on the asthma. It is difficult to prove this, but it is made very probable by the resting respiratory curve of those patients who showed either a permanent hyperventilation or a strong tendency to hyperventilate. This tendency was so strong that any slight stimulus—e.g., a deep breath—caused an increase in the R.V. and irregularity of breathing. For a typical example see fig. 4.

Fig. 3 shows that hyperventilation was present from the beginning and became worse. In this experiment the R.V. was at first fairly large, but a deep breath at once caused a further increase. This habit of overbreathing is shown very clearly also in the period after voluntary hyperventilation. In a normal person, after overbreathing for 2–3 min., a period of very pronounced hypopnœa or even apnœa will follow; the R.V. will sink below the resting level and often approach zero for ½ min. (fig. 1). In our patients this reaction was either absent or subnormal; they continued to overbreathe as before the voluntary hyperventilation or to overbreathe even more (fig. 3). This reaction is paradoxical. When CO_2 has been removed from the blood to excess, the normal stimulus for the respiratory centre has gone, and the respiration comes near apnœa till sufficient CO_2 has accumulated to re-establish the normal rhythm gradually (fig. 1). In our patients the respiratory centre did not react in the same way, possibly because it was in a state of excitement in which the absence of certain amounts of CO_2 from the blood did not constitute a sufficient inhibitory influence.

This abnormality is not found only in asthmatic patients; it is found in many other patients and in normal subjects. Herxheimer and Kost (1929) described eight patients, most of whom had general nervous complaints or slight thyrotoxicosis, who habitually overbreathed. They were examined under basal conditions and during and after exercise, and it was found that in rest the R.V. was abnormally high, and that the respiratory quotient (R.Q.) was above 0·8 and often, for a short period, even over 1·0, a sign that CO_2 was breathed off to excess. From these and many other similar experiments it can be concluded that an abnormally high R.V. in rest indicates (in a subject with an approximately normal basal metabolic rate) a high R.Q. for that period; this means removal of CO_2 to excess. There is little doubt that our patients belong to the same respiratory type. They have at times a natural tendency to overbreathe; and, if there is any excitement, the overbreathing will unconsciously increase, possibly for hours, and thus in some instances produce asthma. This mechanism may be the cause of many so far unexplained attacks of asthma of the "nervous" type, where no allergic cause can be found.

Two small children aged 4 years I have seen lately seem to belong to the same category. The history, given independently by the mothers, is very similar: When the child is naughty and has "to be punished slightly, he gets furious, crying and sobbing all the time. This will go on even when he is put to bed, and after 5–10 min. he is certain to get one of his asthma attacks."

There are some cases of bronchial asthma where a long coughing attack is the primary event, and the typical asthma attack with a wheeze follows after some minutes. It might be possible that also in these cases hyperventilation by coughing plays a causal part.

We should now examine the part played by muscular exercise in provoking asthma. Short severe exercise causes a rather complicated change in gaseous metabolism, which was first described by Hill et al. (1924). In this type of exercise, comparable in intensity to the quarter or half-mile run, so much lactic acid is formed that it often raises its blood-level to more than 100 mg. per 100 c.cm. (Jervell 1928). This excess of lactic acid liberates CO_2 from bicarbonate, forming lactate, and the CO_2 thus liberated increases the arterial CO_2 tension. This increase of arterial CO_2 tension was first shown by Douglas and Haldane (1909) and immediately after short severe exercise it may reach values over 70 mm. Hg (Herxheimer 1926). The excess CO_2 directly or indirectly stimulates the respiratory centre so strongly that ventilation increases steeply, causing the feeling of extreme breathlessness until all the excess CO_2 has been eliminated. During this period the R.Q. rises to values above 1·0, and occasionally it even approaches 2·0. When the exercise is over, the reverse process takes place. Lactic acid is removed from the blood, with a subsequent tendency to replace this loss of acid by the retention of CO_2. The period of excess release of CO_2 with an abnormally high R.Q. is thus followed by a retention of CO_2 with an abnormally low R.Q., which will usually vary from 0·5 to 0·6. (The normal R.Q. varies from about 0·7, pure combustion of fat, to 1·0, pure combustion of carbohydrates.) This retention lasts for some minutes till sufficient CO_2 has been retained, and then the R.Q. gradually becomes normal again, when it represents the actual combustions going on it the body.

In persons who habitually overbreathe this retention of CO_2 does not take place, or it takes place at a later stage, when breathing has become less excited. Herxheimer and Kost (1929) described some exercise experiments with such persons. A typical example is given in the accompanying table. Recovery after this kind of

EFFECT OF EXERCISE IN AN HABITUAL OVERBREATHER

		R.V. per min.	CO_2 per min.	O_2 per min.	R.Q.
Rest		7·43	206·8	247·4	0·836 (*a*)
Work *		68·1	2020·0	1882·0	1·073
Work and recovery	0–2 min.	43·1	1398·0	874·6	1·599
Recovery	2–4 ,,	33·0	908·8	488·2	1·659
	4–7 ,,	21·5	528·3	485·0	1·115 (*b*)
	7–12 ,,	15·2	335·2	347·0	0·966
	12–17 ,,	20·2	422·1	421·4	1·002

* Climbing staircase 17·3 m. high in 30 sec.

Remarks.—(*a*) Increased. (*b*) Pins-and-needles in hands.

exercise is usually complete in 12–17 min. In this case, however, ventilation does not decrease during this period. It rises again, and so does CO_2 output and O_2 intake.

In our cases only the R.V. has been followed up. It remains high for an abnormally long period compared with the reaction of a normal person (figs. 2, 4, 5). The difference between a normal person's and the patients

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R.V. during recovery is very striking. This makes it very probable that more CO_2 is breathed off by these subjects than required by the exercise. Further, it must be considered that the asthma attack never develops during the exercise, nor even immediately afterwards, but 2 min. or more after its end. This is exactly the period during which CO_2 is retained normally. In our cases there is strong evidence that it is not retained. It is suggested that this excess loss of CO_2, with the subsequent shift of pH, causes the bronchial spasm as in voluntary hyperventilation. Additional evidence lies in the fact that, in the two experiments in which it was attempted, CO_2 breathing immediately after the exercise prevented the development of the attack; in a third it nearly prevented it. It is concluded from this that, at least in these cases, the asthma attack after exercise is due to excess hyperventilation during recovery.

SUMMARY

Five cases are reported where slight but typical attacks of bronchial asthma were provoked by voluntary hyperventilation. The history suggests that some of the former asthma attacks of these patients were caused by unconscious hyperventilation during excitement.

In other cases asthma attacks could be provoked by short exercise. They developed during the recovery period. It is suggested that this is also due to excessive ventilation which prevents the normal CO_2 retention during recovery.

In each group no asthma attack could be produced if the excess loss of CO_2 from the body was prevented.

The significance of hyperventilation as a trigger mechanism in bronchial asthma is discussed.

REFERENCES

Douglas, C. G., Haldane, F. S. (1909) *J. Physiol.* **38**, 420.
Herxheimer, H. (1926) *Z. klin. Med.* **103**, 722.
— Kost, R. (1929) *Ibid*, **110**, 1.
Hill, A. V., Long, C. N. H., Lupton, H. (1924) *Proc. roy. Soc.* B. **97**, 84.
Jervell, O. (1928) *Acta med. scand.* Suppl. no. 24.
Rackemann, F. M. (1938) cited by Witts, L. J. (1938) *Proc. R. Soc. Med.* **31**, 533.

LOCAL PENICILLIN FOR THROAT INFECTIONS

R. G. S. MEADLEY
M.B. Leeds
SQUADRON-LEADER, R.A.F. MEDICAL BRANCH

H. F. BARNARD
M.B. Lond.
PATHOLOGIST, DRIFFIELD EMERGENCY HOSPITAL

LOCAL therapy of the pharynx and tonsillar region may be achieved through either the mouth or the nose. In the attempt to maintain an adequate concentration of a drug round the inflamed tissues over an adequate period each route has certain advantages. Most throat pathogens are readily destroyed by a small fraction of a unit of penicillin per c.cm. if its application is maintained for some hours. But to penetrate to the organism and to maintain this concentratiom over some hours an original concentration many times greater is necessary.

PRELIMINARY TESTS

Oral Route.—Various methods of application of penicillin for affections of the mouth have been recommended by different writers, chiefly for treating Vincent's angina, for which uniformly favourable results are reported.

Shallenberger et al. (1945) found that in Vincent's angina swabbing with penicillin solution 500 units per c.cm. 4 times a day was rapidly effective. Strock (1944) and Shuessler et al. (1945) have found penicillin spray or mouth-wash also effective in this condition, and Schwartz (1945) found intramuscular penicillin 100,000 units very successful.

Penicillin pastilles have been chiefly used in this country. MacGregor and Long (1944) used a gelatin pastille which took a variable number of minutes to dissolve. Glucose tablets containing penicillin for oral use (Burroughs Wellcome & Co. and Rowntree & Co. Ltd.) are large (2·0 cm. × 0·5 cm.) and take 10–15 minutes to dissolve if sucked normally, or longer if one suppresses the sucking-reflex. Thus, though pastilles commend themselves for simplicity, their duration is not great; and their value is somewhat nullified by the increase in saliva they produce, which speedily carries to waste much of the antiseptic which might have remained in the mouth and pharynx.

Some tests have been made with fragments of the small tablets of 10,000 units made for general therapy. A very small tablet of this nature dissolves, scarcely noticed, under the tongue in about 2 minutes, without appreciable salivation, and penicillin may be detected in the throat and mouth secretions in useful concentration for a considerable time thereafter (table I).

Nasal Route.—Penicillin snuff has been recommended in the treatment of nasal conditions (Delafield et al. 1941) so it seemed desirable to investigate its possibilities in the treatment of throat infections. The method of administration used is simple.

Penicillin 10,000 units per gramme in sulphathiazole is kept in a small bottle, the metal lid of which has a hole for pouring. A small heap (about 1 cm. in diameter) is poured on to a piece of paper 2 in. square, creased obliquely. With the head back and one nostril closed with the finger, the snuff is tipped from the paper into the other nostril, to the accompaniment of a sharp sniff; the process is then repeated on the other side. The two amounts total about 0·1 g., or 1000 units of penicillin. The film of snuff-coated mucus lining the nose is slowly carried back by the cilia to the pharynx and posterior surface of the tongue. Swallowing and movement of the tongue now bring some of the antiseptic forwards to the fauces. As a visible indicator methylene-blue in glycerin was instilled into the nose; it appeared in the pharynx in about 5 minutes, and round the fauces some minutes later. Arnett (1943) and Vollum and Wilson (1945), using methylene-blue pastilles, found that the pharynx and the tonsils were not coloured appreciably, whereas MacGregor and Long (1945a), though agreeing with regard to the pharynx, found the tonsils well coloured in their tests. Irritative secretion with dyes in the nose, especially in powder form, complicates this method of tracking drugs in the nose, but it is clear that the pharynx, at least, is exposed to a good concentration by this route.

The concentration and persistence of penicillin in the oropharyngeal secretions were tested in volunteers in the following manner. At 1, 2, 3, and 4 hours after taking snuff the volunteer mixed the mucosalivary secretion of the pharynx with that of the mouth and spat 1–2 c.cm. into a sterile tube. During this 4-hour period no food or drink was taken. These samples were tested by the bore-hole plate method. Each test dose was repeated next day; the table therefore shows figures in duplicate. The same volunteers each made the eight tests on successive days. There is some difficulty in persuading people to produce secretions from the pharynx and the fauces; hence explanation and rehearsal were necessary.

Numerous samples from different volunteers showed penicillin detectable 1–4 hours after snuff. The results are irregular, even in the same person at different times, presumably owing to the irregularity of mouth movements and dispersal in a mucoid secretion. Typical results from 4 consecutive volunteers are shown in table I. The taking of a meal clears the throat of penicillin. It seemed, therefore, that a snuff of penicillin 1000 units would maintain a reasonable concentration over the infected tissues for the best part of 4 hours, if no food were taken during this period. A possible advantage of the snuff over the oral pastille is the simultaneous treatment of the nose, nasopharynx, and openings of the sinuses and middle ear.

CLINICAL TRIALS

Selection of Cases.—The patients selected for this investigation were R.A.F and W.A.A.F. personnel of an operational station of Bomber Command. Observations were made on 57 successive cases of acute tonsillitis which occurred sporadically in the 8 months December, 1944–July, 1945. Of these 57 cases, 27 were treated with the penicillin-sulphathiazole snuff ('Penithiazole') and 30 acted as controls, receiving routine treatment. During the greater part of the investigation there was no selective discrimination, alternate cases being treated with penithiazole. It thus happened that at first a large proportion of the cases of Vincent's infection were treated with penithiazole; so towards the end of the

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TABLE I—CONCENTRATION OF PENICILLIN IN THROAT AND MOUTH SECRETIONS AFTER PENICILLIN SNUFF AND ORAL TABLETS

	Volunteer A				Volunteer B				Volunteer C				Volunteer D				Average				Approx. units/ml.			
Interval (hr) ..	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Snuff 1000 units	25	23	17	16	40	35	36	29	18	10	10	10	39	Tr	10	10	30	18	20	17	2·0	0·3	0·4	0·3
	20	17	38	27	45	43	32	25	13	Tr	27	10	40	10	15	Tr								
Snuff 5000 units	29	21	26	37	50	42	27	23	33	22	Tr	10	25	38	30	17	36	32	30	23	5·0	2·0	1·8	0·5
	20	10	16	10	47	46	44	32	47	46	44	32	40	27	38	20								
Tablet 1000 units	20	Tr	10	10	33	12	Tr	10	17	10	10	10	33	25	19	Tr	30	18	14	11	2·0	0·3	0·2	0·05
	33	23	Tr	10	26	17	19	10	39	29	14	15	36	15	Tr	20								
Tablet 5000 units	39	27	20	17	40	34	22	10	38	35	32	23	26	27	10	10	34	25	17	13	3·5	0·8	0·3	0·2
	26	22	17	24	29	22	10	10	39	19	Tr	12	34	18	13	14								

The figures are the diameter in mm. of the inhibition zones in bore-hole plates using the Oxford staphylococcus H and a bore-hole 10 mm. in diam. Tr = Trace of inhibition. 10 = No inhibition. The right-hand column gives approximate equivalent in units per c.cm.

series cases infected with Vincent's organisms were selected as controls to establish approximate equality between the two groups.

Bacteriological Examination.—A throat swab was taken from all the patients on admission to sick-quarters, before any treatment was begun. The swab was immediately sent by hand to the laboratory, where it was plated out, usually within 2–3 hours, on blood-agar and incubated, in the great majority of cases anaerobically. Direct films were made at the same time to determine the presence of organisms of Vincent's angina. In some cases suspicious organisms were tested for soluble hæmolysin.

A further swab was taken and treated in a similar manner after the patient had been treated 3 days; and, in the case of Vincent's infections, further swabs were taken at 3-day intervals until a negative result was obtained. Snuff was discontinued for at least 12 hours before swabbing, after which snuff was again given.

Treatment.—The penicillin-sulphathiazole snuff, containing 1000 units per dose, was administered at 4-hourly intervals during the day, the times being so arranged that no food or drink was taken between doses. In only 2 cases was any difficulty experienced in inhaling the snuff. This was due to occlusion of the nostrils by thick mucus, and in these cases the inhalation of the snuff was preceded by gentle lavage of the nostrils with warm normal saline. The cases treated with penithiazole received no other treatment of any kind other than aperients if required.

The control cases were given a routine treatment consisting of gargles (either thymol or pot. chlor. and phenol), and any local discomfort was relieved with throat paints or codeine. Sedative expectorant mixtures or linctus codeinæ were given to patients developing a cough. The more severe hæmolytic streptococcal infections received sulphathiazole in initial doses of 2 g. followed by 1 g. 4-hourly for the requisite period.

All the patients were accommodated in the sick-quarters and received similar diets, the actual diet depending on the clinical progress.

Clinical Observations.—The patients found no difficulty in the inhalation of the snuff, which was devoid of any discomfort other than a very transient tingling in the nose in the few cases in which there was an associated acute rhinitis. No harmful effects from the treatment were detected.

Relief of symptoms was rapid in the cases treated with penithiazole, whether the infection was streptococcal or with Vincent's organisms. At the outset of the experiment it was thought that a patient who was having only the snuff, and happened to be in the next bed to a patient having frequent hot gargles, throat paint, &c., might feel that he was not receiving adequate medical attention; but it was soon found that the relief of symptoms was so rapid in the test cases that no grievance was likely to arise.

Patients with a severe streptococcal tonsillitis treated with snuff usually made a more rapid convalescence than the controls and less frequently required a period of sick leave before returning to full duty. The fitness of a patient to return to full duty was assessed with the strictest impartiality, so that the data relating to the duration of the illness should not in any way be affected. In the case of patients who were members of air-crew, only the time during which they were unfit for full ground duties was taken into consideration.

Two severe cases with deep lesions, which did not respond after 5 days' treatment with penithiazole, indicate where systemic penicillin is desirable. One was a deep sloughing ulcer showing profuse Vincent's organisms, a high pyrexia, and a deteriorating general condition. The other was a hæmolytic streptococcal tonsillitis developing into a quinsy. Penicillin 20,000 units given 2-hourly for 5 doses produced in both an immediate dramatic recovery.

ANALYSIS OF CLINICAL AND BACTERIOLOGICAL RESULTS

The duration of illness in the two groups, judged by the average number of days off duty, was as follows:

	Hæmolytic streptococci and other infections *		*Vincent's angina*	
	Cases	Days off duty	Cases	Days off duty
Treated with penithiazole	14	7·6	13	11·0
Controls	22	9·6	8	16·8

*No Vincent's organisms found.

It will be seen that the patients with hæmolytic streptococcal infections treated with penithiazole were, on the average, off duty 2 days less than the controls; and that in the Vincent's infections the average period of non-effectiveness was reduced by 5·8 days in the cases treated with penithiazole. A statistical examination shows that the difference in the Vincent's-angina group is almost certainly significant. That in the streptococcal group is of little significance statistically, but clinical impressions lend weight to the difference. It may be observed that, had the two exceptionally severe cases mentioned above been omitted, the figures in each group would have shown a notably larger difference.

TABLE II—BACTERIOLOGICAL RESULTS

Organisms present after 3 days' treatment	*Hæmolytic streptococci* * Percentage of cases		*Vincent's organisms* Percentage of cases	
	Treated with penithiazole	Controls	Treated with penithiazole	Controls
Large decrease ..	16·9	5·6	36·3	18·1
Slight decrease ..	16·9	13·2	13·6	9·0
No change	9·4	28·5	4·5	4·5
Increase	1·8	7·5	4·5	9·0

* No Vincent's organisms found.

DISCUSSION

The number of cases in the series is small and not all of one bacterial causation, and clinical impression suggested a greater benefit from the snuff than the number of days off duty indicate. The beneficial results in the streptococcal group might have been achieved by

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swallowing tablets of a sulphonamide, as was occasionally given in the control series. But, even should this be so, the simplicity and safety of this method give it a place where an extensive outbreak or some other circumstance renders individual medical supervision difficult. For Vincent's angina penicillin is the drug of choice.

The combined attack on tonsillitis from without by local therapy and from within by systemic penicillin, although not yet tested here, might be reasonably expected to give better results than either alone. It is unlikely that in this series the small amounts of sulphonamide or penicillin which might have been absorbed into the blood-stream had an appreciable effect. Where infection is deep or severe, whether it be Vincent's organisms or streptococcal, systemic treatment is clearly called for.

No comparison has been made clinically between the snuff and the small oral pastille; and in an oropharyngeal infection the latter may be equally efficacious, whereas in gingivitis a pastille will be preferable (MacGregor and Long 1945b).

That many cases remain convalescent carriers is in line with the observations of MacGregor and Long (1944) and Robinson (1945) in the case of penicillin and the experience of many others with the sulphonamides (Coburn 1944). The carrier state remains an unsolved problem.

The effect of penicillin snuff in oropharyngeal infections and on the nasal flora makes it not unreasonable to use it prophylactically in virus infections, such as coryza or influenza, to reduce secondary bacterial invasion. It is desirable that this should be the subject of a controlled clinical trial, note being taken of the appearance of organisms resistant to penicillin and sulphathiazole.

SUMMARY

Penicillin administered as small oral tablets of 1000–5000 units by mouth or in similar dosages as a snuff was found in the oropharyngeal secretions in useful concentration often for 4 hours.

Snuff of sulphathiazole containing 1000 units of penicillin per dose has been administered to alternate cases of 57 sore-throats due to hæmolytic streptococci or Vincent's organisms. The controls received gargles and throat sedatives.

A more rapid relief of symptoms and a shorter period off duty was obtained in the penicillin-treated cases, more especially in those with Vincent's angina.

Bacteriologically there was a probably significant clearing in both types of infection effected by penicillin snuff.

Two severe cases, one streptococcal and one of Vincent's angina, which did not respond to local penicillin but rapidly improved on systemic penicillin, are mentioned to show where systemic therapy becomes the method of choice.

We wish to thank the Director-General of Medical Services, R.A.F., for permission to publish this article; Dr. P. N. Panton, director of the E.M.S. pathological service, for permission to publish and for helpful criticism; Flight-Lieutenant L. Blashki, M.B., R.A.A.F., for assistance in supervising the clinical work; and the German P.O.W. medical students on whom the preliminary tests were carried out.

REFERENCES

Arnett, J. H. (1943) *Amer. J. med. Sci.* **205**, 6.
Coburn, A. F. (1944) *Nat. med. Bull., Wash.* **42**, 325.
Delafield, M. E., Straker, E., Topley, W. W. C. (1941) *Brit. med. J.* **1**, 145.
MacGregor, A. B., Long, D. A. (1944) *Ibid*, **ii**, 686; (1945a) *Lancet*, **ii**, 299; (1945b) *Brit. dent. J.*; **78**, 33.
Robinson, P. (1945) *Brit. med. J.* **ii**, 213.
Schwartz, B. M. (1945) *J. Amer. med. Ass.* **128**, 704.
Shallenberger, P. L., Denny, E. R., Pyle, H. D. (1945) *Ibid*, **128**, 706.
Shuessler, C. F., Fairchild, J. M., Stransky, I. (1945) *J. Amer. dent. Ass.* **32**, 551.
Strock, A. E. (1944) *Ibid*, **31**, 1235.
Vollum, R. L., Wilson, G. S. (1945) *Brit. med. J.* **i**, 545.

THE Cecil Joll Memorial Fund has reached £1050. The date of closure for subscriptions is March 1. The intention of the promoters was to ask the president and council of the Royal College of Surgeons to establish a biennial or triennial prize essay on a surgical subject.

HUMAN PULMONARY TUBERCULOSIS DUE TO AVIAN TUBERCLE BACILLI

REPORT OF A CASE

F. C. S. BRADBURY
M.D. Belf., D.P.H.
CONSULTANT TUBERCULOSIS OFFICER, LANCS. COUNTY COUNCIL

Pathological report by
J. A. YOUNG, M.B. Edin., Dipl. Bact.
SENIOR SCIENTIFIC OFFICER, INSTITUTE OF ANIMAL PATHOLOGY, CAMBRIDGE

ACCORDING to Gloyne (1933) no case of human tuberculosis due to avian-type tubercle bacilli had been reported in this country up to 1933, and I am not aware of any case having been reported since then. Practically all of the 14–20 cases so far recorded originated on the Continent, and of these only 3 were cases of pulmonary tuberculosis.

For some years I have typed all positive specimens dealt with in my laboratory, and as a result of this routine procedure the present case of avian infection was discovered. So far, among many hundred typings, only this one avian infection has been found, although other curiosities have been met, such as mixed human and bovine infection in the same subject.

CASE-RECORD

A man, aged 59, was first seen in July, 1942, because of a hæmoptysis, when his general condition was good, apart from the loss of a few pounds in weight. A few râles were noted at the right apex posteriorly. At this time a radiogram showed slight general opacity of the right apex, interspersed with fine streaky mottling. The rest of the lung fields showed nothing of note apart from a very small deposit at the extreme left apex. The patient was in good circumstances and declined to have sanatorium treatment or to coöperate with the dispensary organisation, apart from the submission of occasional specimens of sputum. Specimens cultured in July and November, 1942, and in September, 1943, all gave pure cultures of avian tubercle bacilli without admixture of other types. The diagnosis of type was based on the clearly defined characters of the organism when subcultured on the differential media which I use for this purpose; a description of this technique has not yet been published.

Through the kindness of Dr. J. A. Young, of the Institute of Animal Pathology, Cambridge, numerous animal-inoculation tests were made both with the material cultured by me from the patient's sputum and with material from sputum sent direct to Cambridge by the patient to avoid contamination or confusion in my laboratory. Dr. Young's report is appended to this communication.

The patient's progress could not be traced in detail, but in June, 1945, he came under observation again because of a further hæmoptysis, after having remained at work, except for short intervals, up to a month previously. This time he was a sick man, with much cough and sputum, dyspnœa, and pyrexia. A radiogram now showed that the disease on the right side had spread, and that large cavities were present above and below the clavicle; there had been a further involvement of the left upper lobe, where mottling now extended to the middle zone. The disease had progressed much as it might have been expected to if due to ordinary human-type tubercle bacilli.

COMMENTS

It does not appear possible to establish with certainty how this patient became infected with avian tubercle bacilli. He has never kept poultry, although he kept and bred over a hundred budgerigars for two years, between ten and twelve years before the onset of his illness in 1942. He did not allow the birds to peck morsels from his lips. He has had some slight contact with fowl carcases during his work as a hotel manager, but nothing closer than receiving them and handing them over to the chef. His family history is completely negative as regards tuberculosis.

If any of the foregoing suggested vehicles of infection were actually of much importance as determining factors in causing implantation of avian tubercle bacilli in the

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human subject, such infection would probably be fairly common, since many people are exposed to similar risks.

There is, however, one feature of the present case in which the patient shows a quantitative peculiarity which distinguishes him from others—for many years before 1942 he was in the habit of taking every day a raw egg beaten up in milk, and often more than one. He assured me that it would be an understatement to say that for 30 years he had at least one raw egg daily in this manner. Raw eggs have been shown to contain living avian tubercle bacilli (Feldman 1938), and it seems reasonable to infer that the patient's infection was derived from this source.

According to Feldman only 13 proved cases of avian-type tuberculosis in man have been sufficiently investigated to be accepted beyond doubt. The results of animal-inoculation tests in the present case appear to place it in the same category. The following quotation from the same author leaves little if any comment for me to add:

"When one considers the countless thousands of instances in which the type of the tubercle bacillus in human infections has been determined since the time of Koch, it may seem strange that the avian tubercle bacillus has been demonstrated so rarely. The explanation can only be that human beings have a formidable resistance to this particular form of the tubercle bacillus. The opportunities for infection are numerous, and if the avian tubercle bacillus were virulent in the accepted sense for human beings, it would seem reasonable to expect a far greater number of proved cases. Apparently, therefore, it is only the exceptional individual who becomes infected with the avian tubercle bacillus."

Of the 13 patients referred to, 6 died shortly after coming under observation; and, although Feldman does not describe in detail the clinical findings in the remainder. it is at any rate clear that avian infection cannot by any means be regarded as trivial. The position appears to be much the same as the comparison between bovine- and human-type infections in man: it seems to make little difference to the course of the disease, and there is no clinical picture which can be regarded as characteristic of one or other type.

In the present case the clinical course of the disease shows no well-marked difference from infections with human or bovine types of tubercle bacilli.

Tulloch (1935) sets out in some detail the criteria required to justify the acceptance of a strain of tubercle bacilli as being of avian type, including optimal temperature of growth and pathogenicity for animals. I attempted to adapt a temporary incubator to work at a temperature of 41–42° C. with the object of showing that the present avian strain grew better at this temperature than at 37–38° C.; but, owing to a series of difficulties with capsules and spark-suppressing condensers, the attempt was not successful. In view of the weight of other evidence it was not thought necessary to spend further time on this point. The criteria regarding pathogenicity for animals are amply fulfilled, as indicated in Dr. Young's report.

With regard to the use of tuberculin Tulloch states that "... although in the future it may be found that avian and mammalian tuberculins react specifically in relation to the type of invading bacillus, we should, for the present, adopt a critical attitude in relation thereto." Feldman (1938) goes a little further and suggests that, although a positive reaction to avian tuberculin associated with a positive reaction to mammalian tuberculin does not indicate an avian-type infection, the avian type of infection might be assumed to exist if the reaction to avian tuberculin was positive and the reaction to mammalian tuberculin was negative or considerably less intense. Gloyne (1933) records that 4 of the accepted cases of avian-type infection gave a positive avian tuberculin test with a negative or weak Old Tuberculin test.

In the present instance the patient was tested with avian tuberculin kindly supplied by Prof. T. Dalling, of the Ministry of Agriculture and Fisheries, and by standard human tuberculin prepared from Old Tuberculin (B.W.CO.). The avian tuberculin was in the form of a solution of purified protein derivative in a strength of 0·4 mg. per c.cm. This was used in dilutions of 1 in 4000 and 1 in 400, corresponding to 1 in 100,000 and 1 in 10,000 in terms of ordinary tuberculin. The patient gave a positive response (16 mm. diameter) to the intradermal injection of 0·1 c.cm. of 1 in 100,000 and 1 in 10,000 avian tuberculin and a completely negative response to 1 in 100,000, 1 in 10,000, and 1 in 1000 Old Tuberculin.

PATHOLOGICAL REPORT

Two strains, isolated from the patient's sputum at widely separated periods of time, have been studied as regards their morphological and cultural characteristics and their pathogenicity for laboratory animals.

The first specimen received was a subculture on unglycerinated Löwenstein's medium. To observe the growth of single colonies a small portion of the culture was inoculated subcutaneously into a guineapig and the strain re-isolated from the regional lymph-gland after three weeks.

The second specimen was a sample of sputum forwarded direct to Cambridge by the patient. The sputum was bloodstained and mucopurulent, and films stained with Ziehl-Neelsen revealed the presence of rather scanty acid-fast organisms, some of which were minute uniformly staining rods, while others were longer but thin and beaded. Other organisms were present, among which were streptococci in large numbers. These were destroyed by treatment with 5% KOH, and the acid-fast strain was isolated by both direct culture and indirect culture through guineapigs.

The cultural characteristics of both strains were very similar, any difference between them being attributable to the difference in lengths of time over which they had been grown on artificial media.

On unglycerinated egg medium the primary colonies, although readily visible to the naked eye by the 14th day, were small, moist, colourless, and highly convex, and their further growth was slow, for after several weeks most of the colonies were still relatively small shining domes, although there was a change in colour to creamy white. In the case of the more recently isolated strain many of the colonies developed a narrow crinkled margin, but in both strains crateriform colonies of secondary type were unusually scanty and late in developing.

Films prepared from young cultures and stained with Ziehl-Neelsen showed a preponderance of short acid-fast bacilli, but further films prepared after the colonies of secondary type had begun to appear revealed the typical picture of branching and numerous non-acid-fast forms.

On glycerinated egg medium the primary colonies were larger than those on unglycerinated egg and showed no tendency to marginal differentiation. Although they were distinctly more yellow than the colonies on unglycerinated egg, pigment formation was not well-marked, and in only one instance did the colonies take on a rich golden hue.

Subcultures on unglycerinated and glycerinated serum yielded moist, creamy white, and paint-like growths, more profuse on the latter medium, and subculture on glycerin potato produced a creamy white glistening nodular growth.

Pathogenicity.—Both strains were tested by the intravenous inoculation of 0·01 mg. and 0·001 mg. of a seven-day-old subculture on unglycerinated egg into rabbits and fowls, and in each case there was set up a progressive infection of a type characteristic of infection with an avian strain. The details of the post-mortem findings in two of the rabbits are given below.

RABBIT 169, inoculated intravenously with 0·01 mg., died 68 days later.

Lungs pale and œdematous, numerous small yellow tubercles.

Liver not enlarged; firm and waxy in appearance.

Spleen enlarged and congested; numerous pin-head tubercles.

Kidneys: numerous tiny ill-defined tubercles.

Appendix: a few ill-defined tubercles.

Peritoneum: tiny tubercles in region of kidneys and extending down line of ureters.

Knee-joints infected and femoral marrow replaced by granulomatous tissue. Tubercles in tendon sheaths at ankle-joints and in fascia over elbow-joints.

One small tubercle in right corneo-sclerotic junction and two in left lachrymal gland.

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RABBIT 210, inoculated intravenously with 0·001 mg. was moribund when killed 99 days later.

Lungs: a few pin-head tubercles scattered over surface of crepitant lung.

Liver: two pin-head tubercles, tissue degenerate in appearance and interlobular markings prominent.

Spleen somewhat enlarged and congested. × 10 lens showed stippling with pin-point white foci.

Kidneys: × 10 lens showed numerous white pin-point foci on surface; one pin-head tubercle in capsule on right side.

Appendix: numerous pin-head lesions; also a few in cæcum.

Femoral marrow degenerated. Numerous pin-head tubercles in fascia and tendons round knee-joints. Epiphyses rarefied and breaking down. Right elbow-joint enlarged and cavity infected. Tubercles in both lachrymal glands.

In all four fowls lesions were found in lungs, liver, and spleen, the brunt of the infection being borne by liver and spleen.

Both strains proved incapable of setting up a progressive infection in guineapigs. The subcutaneous inoculation of 0·1 mg. of the first strain into two guineapigs produced local lesions and enlargement of the regional lymph-glands. The lesions, however, regressed after a few weeks; and, when the animals were killed 1 year and 76 days after inoculation, no macroscopical evidence of infection remained in one, while in the other the only trace of infection was a small caseous focus in the regional lymph-gland.

In the case of the second no measured dose was used, but of the two guineapigs inoculated directly with the patient's sputum the first, when killed at 42 days, showed only a healing ulcer, with a few underlying tiny caseous foci and a partly caseous regional gland, and in the second, killed six months after inoculation, all that remained at the site of inoculation was a small pigmented area. Further evidence of infection was limited to a small caseous area in the right inguinal gland.

In the case of both specimens the cultural characteristics of the organism, its pathogenicity for the rabbit and the fowl, and its lack of pathogenicity for the guineapig indicate that it is of avian type.

SUMMARY

A case of human pulmonary tuberculosis is described in which the causal organism is shown to satisfy most of the known criteria for regarding it as an avian tubercle bacillus and not to be at variance in any known respect with these criteria.

The patient also responds to avian tuberculin but not to human tuberculin.

REFERENCES

Feldman, W. H. (1938) Avian Tuberculosis Infections, Baltimore.
Gloyne, S. R. (1933) *Bull. Hyg., Lond.* 8, 39.
Tulloch, W. J. (1935) *Trans. Tuberc. Soc. Scotland*, 1934–35.

CONTROL OF SONNE DYSENTERY WITH SUCCINYLSULPHATHIAZOLE

R. L. VOLLUM M.A., D.Phil. Oxfd
J. A. H. WYLIE M.B. Lond.
From the Emergency Public Health Laboratory, Oxford

Two preparatory schools had been evacuated to a single country house. Dormitories and sick-rooms were separate, each school having its own matron. Each school had a bathroom, and indoor and outdoor water-closets were available. Kitchen and dining-room were shared. Communal games were sometimes played, and classes were taken together. At the beginning of each term during the previous 2 years there had been outbreaks of diarrhœa in both schools. No bacteriological examinations were made, but the clinical course suggested mild bacillary dysentery.

A similar but more extensive epidemic occurred in October, 1944. *Bacterium sonnei* was isolated from the fæces of the first 5 cases. Before the organism was identified, several further cases had developed, and at the request of the school doctor a more extensive investigation was undertaken. Rectal swabs from all the boys and members of the staff were taken; these were plated immediately on Leifson's desoxycholate-citrate-agar medium in which *para*-aminobenzoic acid had been incorporated, and the plates were incubated on return to the laboratory. The organisms were identified by the rapid diagnostic tube-agglutination method originally used by Topley and Ayrton (1924) and described in detail by one of us (Wylie 1944). *Bact. sonnei* was isolated from 17 out of 33 boys in school A and from 16 out of 37 boys in school B on the first examination.

TREATMENT

At first the amount of succinylsulphathiazole available was sufficient to treat only 10 cases: six cases selected from school A and 4 from school B were given 6 g. daily for five days. This was administered in six separate doses, each of two 0·5 g. tablets. All boys were swabbed weekly for the following three weeks. Two days after the end of the course of treatment only one of the 10 still had a positive swab. This was a persistent heavy carrier in school A, who was found to be excreting *Bact. sonnei* on 7 occasions in the next 2 months. The epidemic was still spreading in the schools, and within four weeks 8 out of the 10 treated cases were again yielding positive swabs.

In the meantime a larger supply of succinylsulphathiazole had become available, and it was decided to treat every boy in school B with 6 g. a day for 5 days, leaving school A as a control group. At the beginning of the course 23 of the 37 boys in school B were positive, only 5 boys in this school having remained negative throughout. In school A at this time only 3 of the 33 boys had escaped infection altogether. Ten days after the completion of the course all the boys in school B were negative; they remained so during the ensuing three months, except one who was positive on a single occasion three weeks after cessation of treatment.

In school A, the controls, 14 out of the 33 boys were still positive; of these, 4 continued to excrete *Bact. sonnei* during the next month. Further, 5 boys who had been negative at the start of the experiment relapsed during this period, and 2 fresh cases arose. At the beginning of the Christmas vacation these 11 carriers in school A were given a full course of succinylsulphathiazole. On reassembly after the holiday all the boys in both schools were bacteriologically examined for *Bact. sonnei* and found to be negative; they were all still negative when swabbed again two months later.

At no time during or after the administration of this dosage of succinylsulphathiazole were any toxic symptoms observed.

DISCUSSION

The drug treatment of institutional dysentery usually presents a serious administrative problem. The earlier attempts at chemotherapy were not very successful, mainly because treatment had to be carried out with the soluble sulphonamide compounds, such as sulphanilamide and sulphapyridine. Since these drugs are absorbed mainly from the upper part of the small intestine, large doses with a corresponding risk of intoxication had to be given in an attempt to maintain a sufficiently high concentration at the site of the disease in the colon and rectum. The introduction of the relatively insoluble sulphonamide drugs, such as sulphaguanidine and succinylsulphathiazole, which are less readily absorbed from the small intestine, has greatly diminished the risks of systemic intoxication.

Sulphaguanidine has been used extensively in the treatment of Flexner dysentery and to a less extent in Shiga, Sonne, and Boyd types of infection. Reports on the efficacy of this drug have varied, though on the whole they have been favourable. Differences have arisen mainly from the adoption of different criteria as an index of bacteriological cure. Anderson and Cruickshank (1941) found, in a series of 41 cases treated during the acute stage and 55 controls, that some mitigation of the symptoms of Flexner dysentery could be brought about by the early administration of sulphaguanidine, and that the subsequent convalescent carrier-rate was about 3 times higher in the controls than in the treated group. Similarly, favourable results were reported by Smith (1944) and Hardy and his colleagues (1942). The latter group of investigators also obtained encouraging results in a small number of cases of Sonne dysentery. Less satisfactory results, however, were obtained by Jamieson and his colleagues (1944), who observed that about a third of their treated cases relapsed during

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convalescence. Rantz and Kirby (1942) consider that sulphaguanidine is of doubtful value in both Flexner and *Bact. alkalescens* infections. Osborn and Jones (1944), using the dosage of sulphaguanidine recommended by the Medical Research Council (1943), obtained disappointing results in 71 cases of Sonne dysentery; but they got better results with larger doses.

The evidence for the value of succinylsulphathiazole in the treatment of acute bacillary dysentery and the carrier state is contradictory for the same reasons as for sulphaguanidine. It is generally agreed that this drug is even less toxic than sulphaguanidine; its use, however, has hitherto been restricted owing to short supply. Roberts and Daniels (1943) used succinylsulphathiazole in an epidemic due to the Boyd-88 type; the carrier-rate during convalescence in the control group was 18·2% as opposed to 2·6% in the treated. Brewer (1944) used succinylsulphathiazole in the control of Sonne dysentery and reported favourable results. Fairbrother (1944) however, found both drugs to be ineffective in controlling the convalescent carrier-rate in Sonne dysentery. He took as his criterion of bacteriological cure 12 negative swabs on consecutive days and suggested that any less rigid test tended to lead to unduly favourable reports on the efficacy of these drugs owing to the persistence of small residua in the intestine. Fairbrother further suggests that *Bact. sonnei* may behave in its intestinal habitat in a similar manner to *Streptococcus pyogenes* in the throat, in that it resides in the mucosal crypts, where in time it becomes almost saprophytic. When this state is reached, the organisms become extremely difficult to eradicate, partly because of anatomical inaccessibility and possibly also because of an acquired resistance to sulphonamides.

Our results, however, suggest that the apparent failure in certain circumstances of succinylsulphathiazole to bring about bacteriological cure is due to reinfection. In the series described above, when the 10 patients were treated and allowed to mix freely with their fellows in both schools, most of whom were excreting *Bact. sonnei* in large numbers at the time, 8 became positive again in four weeks. When one whole school was treated, the opportunity for reinfection was less, owing to separate sleeping and dressing accommodation, with the result that far greater success attended the treatment. Further, when the chronic carriers in the control school A were treated and then went home for the holidays, where reinfection was even less likely, they were found to have cleared on their return to school. We feel that the very rigidity of the criteria which Fairbrother prescribed, apart from the difficulty of applying them in civilian practice, must to some extent have vitiated his investigation, since during the time necessary for 12 daily rectal swabs to be obtained from the population under investigation the non-excreters must have been frequently exposed to the risk of reinfection from those who were still excreting the organism.

Both from our own results given here and from the published work reviewed we conclude that, at the time of writing, succinylsulphathiazole presents the best means of eradicating the infection in outbreaks of Sonne dysentery, provided every effort is made to reduce to a minimum the chances of reinfection after the end of treatment. In a school or nursery this can be done only if the resident staff are able and willing to coöperate. A short informal talk to explain the treatment and how it will best succeed is most helpful in this respect.

SUMMARY

An extensive outbreak of Sonne dysentery in two schools in the same building is described.

At first only a limited quantity of succinylsulphathiazole was available, and 10 boys selected from both schools were given 30 g. in 6 one-gramme doses daily for five days. They were not isolated from the other boys, most of whom were at this time heavy carriers. Of the 10 treated cases 8 relapsed in four weeks.

At the height of the epidemic more of the drug became available, and all the boys in one of the schools were treated with succinylsulphathiazole, the other school being left as a control.

In the control school 11 boys out of 33 continued to excrete the organism. In the treated school all 37 boys became negative, except 1 boy who yielded a single positive swab 3 weeks after the course of treatment.

Some of the published work on the sulphonamide treatment of bacillary dysentery is reviewed. It is concluded that reinfection rather than persistence of the causal organism is the explanation of the apparent failures reported by some workers using succinylsulphathiazole to bring about a bacteriological cure.

At the present time succinylsulphathiazole is the best available drug for the control of Sonne dysentery, provided every precaution is taken to avoid reinfection.

Our thanks are due to Dr. T. Lionel Crawhall, the school medical officer, who invited us to investigate the epidemic, and to the staffs of both schools, whose wholehearted coöperation throughout made the investigation possible.

REFERENCES

Anderson, D. E. W., Cruickshank, R. (1941) *Brit. med. J.* ii, 497.
Brewer, A. E. (1944) *Lancet*, ii, 471.
Fairbrother, R. W. (1944) *Brit. med. J.* ii, 489.
Hardy, A. V., Watt, J., Peterson, J., Schlosser, E. (1942) *Publ. Hlth Rep., Wash.* 57, 529.
Jamieson, W. M., Brodie, J., Stiven, D. (1944) *Brit. med. J.* i, 322.
Medical Research Council (1943). War Memorandum No. 10.
Osborn, W. H., Jones, R. N. (1944) *Lancet*, ii, 470.
Poth, E. J., Knotts, F. L., Lee, J. T., Inu, F. (1942) *Arch. Surg.* 44, 187.
Rantz, L. A., Kirby, W. M. M. (1942) *J. Amer. med. Ass.* 118, 1268.
Roberts, T. L., Daniels, W. B. (1943) *Ibid*, 122, 651.
Smith, H. G. (1944) *Brit. med. J.* i, 287.
Topley, W. W. C., Ayrton, J. (1924) *J. Hyg., Camb.* 22, 222.
Wylie, J. A. H. (1944) *Mon. Bull. Min. Hlth*, 3, 156.

DENGUE GROUP OF FEVERS IN INDIA

P. V. KARAMCHANDANI
M.B. Bombay, F.R.C.P.E.
LIEUT.-COLONEL I.M.S. (SECONDED I.A.M.C.); MEDICAL SPECIALIST, FEROZEPORE

THE saddle-back temperature and rash characteristic of dengue are not essential to the diagnosis. Of 110 cases seen at Madras (Karamchandani 1937) 54 had a saddle-back temperature and fever lasting on an average just over 5 days; 17 a continuous temperature lasting on an average 7·17 days; and 39 a pyrexia lasting on an average 3·28 days without saddle-back temperature. No eruption was noted in any of these 110 cases.

At Ferozepore in October, 1943, I saw 18 cases, of which 10 had a saddle-back temperature, the fever lasting on an average 4·8 days; 2 had a continued fever; one a short one-phase type of temperature; and one a three-phase saddle-back pyrexia. A profuse macular rubeoloid eruption, very characteristic of dengue, was present in 8 cases.

Whereas classical dengue with saddle-back temperature and a rash may be a distinct disease, several varieties can be distinguished, not only in different epidemics but also in the same epidemic. This is borne out by Dinger and Snijder's experiments, in which mosquitoes infected in Sumatra were brought to Amsterdam and allowed to transmit the disease to volunteers. Although the infection was due to a common virus, various types of fevers were produced in different people (Manson-Bahr 1940).

Although *Ædes ægypti* has now been universally recognised as the vector, *A. albopictus*, *A. tæmorhyncus*, and *Culex fatigans* continue to be suggested as alternatives (Manson-Bahr 1940). I consider that, in Madras at least, *Culex fatigans* is mainly responsible. In Ferozepore no *Ædes ægypti* have as yet been identified in the catches of culicinæ.

From the available evidence I feel that the conception of a dengue group of fevers is justified. I believe that the 5-day fever of Scheer and 7-day fever of Rogers are examples of the same disease. The grouping together of those fevers would focus medical attention on sporadic mild forms of fever which at present are diagnosed either as clinical malaria or as influenza. The question of sandfly fever is more debatable, but there are certain clinical and ætiological similarities between this and the dengue group. Both diseases are transmitted by an insect, the infection being caused by a filtrable virus in the blood-stream. Both are diseases of warm climates and clinically have a short incubation period and a brief rapidly developed fever associated with a slow pulse, leucopenia, and relative decrease of polymorphonuclear

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cells. The viruses of dengue and sandfly fever have much in common. The main features of the "dengue group of fevers" would be as follows:

(1) Sudden and abrupt onset, with generalised pains and no local manifestations of an acute inflammatory condition, such as tonsillitis or a septic infection.
(2) Absence of parasites in the blood and absence of leucocytosis—rather a tendency to progressive leucopenia.
(3) Fever with a short self-limited course, the temperature being (*a*) of the saddle-back type, either continuous (average duration 5 days) or interrupted (average duration 5 days); (*b*) continued (average duration 7 days); (*c*) of the short one-phase type (average duration 3 days); or (*d*) of the larval type (average duration less than a day).

Varieties in the disease are due to differences either in the strains of the virus or in the susceptibility of the patient.

My thanks are due to Colonel B. Schlesinger, consulting physician, N.W. Army and Central Command (Combined), for going through this paper.

REFERENCES

Karamchandani, P. V. (1937) *Indian med. Gaz.* **72**, 532.
Manson-Bahr, P. (1940) Manson's Tropical Diseases, pp. 396, 397.

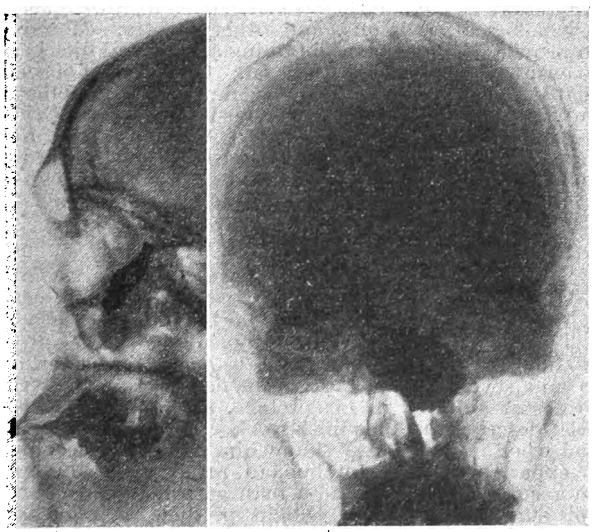
GUNSHOT WOUND OF BOTH ORBITS

REPORT OF A CASE

D. L. CHARTERS
M.B. Glasg., D.O.M.S.
MAJOR R.A.M.C., OPHTHALMIC SPECIALIST

AN American private, aged 36, was wounded by a shell fragment on Oct. 8, 1944, and taken prisoner. He was treated at various German hospitals and reached the British Prisoners-of-war Eye Hospital on Feb. 17, 1945.

On admission I found a healed wound at the outer half of the lower margin of the left orbit. There was a history that the wound had been septic, but the scar, though adherent to bone, was only moderately thickened. The left eyeball was intact, was displaced a little upwards, and moved reasonably freely, except that there was defective movement upwards, apparently due to weakness of the inferior oblique muscle, presumably owing to direct injury. The right eyeball was intact but was proptosed about 7 mm. forwards and a little outwards.



Lateral and anteroposterior views of skull.

The patient complained of double-vision in all directions of the gaze. Vision was 6/24 in each eye. The fundi and media were normal. On radiography (see figure) an irregular foreign body was revealed lodged transversely in the nose and encroaching on both orbits. The foreign body measured approximately 35 × 20 × 3 mm. On the right side it had entered the apex of the orbit in the posterior ethmoidal region. On the left side it lay in the superomedial recess of the maxillary antrum and the inferomedial angle of the orbit.

On Feb. 20, under 'Pentothal' anæsthesia, the nose was explored and the foreign body located and grasped in the left nostril with sinus forceps. An attempt was made to assess its mobility, and it was found to be fixed rigidly. There was a good deal of purulent discharge high up in both nostrils. As I had no anæsthetist and no assistant other than my R.A.M.C. orderlies, I hesitated at first to attempt operation, but this was undertaken on the 28th using at first local anæsthesia (2% procaine) and in the last stages pentothal. Anæsthesia was rendered easier because the foreign body had cut through the infra-orbital nerve. The wound of entrance was excised and extended along the orbital margin, and a large flap was turned down, exposing the maxilla. The antrum was fully opened, and the track of the missile was followed through the roof and medial wall of the antrum. A large opening was made in the medial wall of the antrum to ensure postoperative drainage into the nose. The antrum was filled with mucopurulent discharge. At this stage the left inferolateral corner of the foreign body was exposed and freed until it could be grasped with bullet forceps. It was rigidly fixed but was eventually extracted under the pentothal anæsthesia. The sinus and the area of operation were then soaked in a mixture of 'Albucid Soluble' (30%) and penicillin, and the external wound was closed in layers. Healing took place by first intention, all stitches being out by the 4th day.

A month after operation the patient was liberated by the advancing American 7th Army, and I am out of contact with him. At this time vision in each eye had improved to 6/12, and the proptosis of the right eye was subsiding. There was still diplopia and defective upward movement of the left eye.

I believe this case to be unique because of the size of the foreign body, and the fact that it invaded both orbits without injuring either globe.

Medical Societies

SOCIETY OF MEDICAL OFFICERS OF HEALTH

AT a meeting of the fever group on Nov. 30, 1945, with Dr. M. MITMAN in the chair, a discussion on

Human γ-Globulin

was opened by Mr. B. R. RECORD, PH.D. (Lister Institute). Recognition that the various antibodies present in immune serum are associated with the globulin part of the serum, and indeed for the most part with a particular kind of globulin, has, he said, stimulated research into methods of separating human plasma into its component parts for the better utilisation of their physiological properties. In attempts to fractionate and concentrate the various constituents—particularly the antibody constituents for use in the prophylaxis or treatment of infectious diseases—the ultracentrifuge and the electrophoresis apparatus have been of great value. They make it possible to determine the relative amounts of the several components of plasma with fair accuracy and with little disturbance of their physico-chemical and physiological properties.

In the ultracentrifuge, human plasma shows, broadly speaking, only two sedimenting boundaries, corresponding to a fast-sedimenting component (globulin) and a slower sedimenting component (albumin). In the electrophoresis apparatus, on the other hand, at blood pH, the serum-globulin appears as at least three distinct components, designated—in descending order of mobility—α-, β-, and γ-globulin. Although these different globulins have essentially the same molecular size and shape, and therefore sediment as a single boundary in the ultracentrifuge, they show differences in respect of ionisable groups, which are revealed in differences in their rates of migration in an electric field. For this reason, electrophoresis has become a valuable analytical method in studies on the fractionation of plasma protein. So far, however, it has not been developed for the separation of plasma components on a large scale. During the war Cohn and his co-workers made an extensive study of alcohol fractionation of human plasma, and this method is used in America for the large-scale preparation of various components of human plasma. Most of the antibody activity is associated with the γ-globulin fraction, which has been issued to clinicians.

CLINICAL TRIALS

Dr. WILLIAM GUNN (L.C.C.) said that the clinical use of the various components of human plasma-protein

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naturally developed from Cohn's fundamental researches on their separation by high-speed centrifugalisation and electrophoresis and subsequent analysis of their biochemical and immunological characters. The main component, albumin, comprising 55–60% of the protein, was shown to have very high osmotic activity, and in a 25% solution was used on a considerable scale to combat shock among American Service casualties. γ-Globulin represents about 11% of the total protein and contains all the immune substances in the circulating blood; although the amino-acid constitution of this fraction differs appreciably from that of α- and β-globulins and of albumin, attempts to identify and isolate pure antibody and to correlate its immunological properties with chemical constitution have hitherto failed.

γ-Globulin is issued in a specially buffered solution, having a protein content of 16·5 ± 1·5%, in 5 c.cm. ampoules, each representing approximately 125 c.cm. of the parent plasma (from a pool obtained from several thousand donors). It is relatively stable compared with unaltered human serum and can be heated at 57° C. for 4 hours without loss of potency, whereby the agent of homologous serum jaundice is destroyed. Samples of Cohn's original fraction II and several batches of γ-globulin prepared by different United States manufacturers were made available by the courtesy of the American Red Cross for clinical trial in this country.

Preliminary tests suggested that, volume for volume, γ-globulin is about twice as potent against measles as an average pooled convalescent serum. In the protection trials the American dosage recommendation of 0·1 c.cm. per lb. body-weight was followed; this was found sufficient at ages under 1 year and over 5 years, but in 10–15% of cases in the most susceptible age-group, 1–5 years, it did not prevent measles though in nearly all there was moderate to pronounced attenuation of the disease (except in respect of one particular batch). Most of the inoculations were given to home and hospital or nursery measles contacts in and around London and in Glasgow, where the trials, supervised by Dr. T. Anderson, of Knightswood Fever Hospital, gave substantially the same results. Some degree of success for γ-globulin has been claimed by American workers in the prevention of infectious jaundice. In a small uncontrolled series, γ-globulin seemed to protect children against whooping-cough and chickenpox, and Dr. Gunn thinks its use may be extended to the control of all the ordinary infectious diseases. In the treatment of measles its action has been found less certain, but more clear-cut results may be expected from the intravenous administration of the latest preparation which Cohn has recently claimed to be free from risk.

Dr. NORMAN D. BEGG (L.C.C.) described a comparative test of γ-globulin and reconstituted dried convalescent measles serum. As modification of attack and not prevention was the aim, dosage was pitched low. Summarising the experience of five outbreaks of measles in whooping-cough wards it appeared that of 22 susceptible contacts injected with 2·5 c.cm. of the convalescent serum 12 developed measles and in only 4 of these was the disease very sharply attenuated, whereas 24 contacts of comparable ages from the same outbreaks injected with 1·2 c.cm. of γ-globulin produced 8 cases of measles of which 6 were much modified. This limited experience suggested that γ-globulin has a measles-antibody content at least twice that of convalescent measles serum, but further experience is necessary to fix dosage more precisely and to adjust it if necessary to body-weight at various ages. With adequate preliminary field testing of individual batches, γ-globulin in doses of 0·1 c.cm. per lb. body-weight seems to give high protection-rates against measles in exposed contacts. The results of treating established measles have been disappointing: one patient who was given 15 c.cm. of γ-globulin intramuscularly when the first Koplik's spots were visible (54 hours before the skin eruption appeared) developed an unmodified attack.

Dr. W. H. KELLEHER (L.C.C.) said that in the treatment of poliomyelitis the value of any serum is doubtful. Having abandoned the use of convalescent poliomyelitis serum for this purpose, he decided to try γ-globulin, but in 10 cases given an average of 34 c.cm. the results were entirely negative. Inconclusive results were obtained in treating 2 cases of acute toxic polyneuritis, and no improvement was seen in a case of acute myelitis. Certain poliomyelitis contacts with definite cerebrospinal-fluid changes who were injected with γ-globulin did not develop paralysis, but this was probably without significance. In reply to a question Dr. Kelleher said he has not given γ-globulin intrathecally; there are physiological reasons against antibodies reaching the anterior horn cells from the spinal canal.

Dr. H. J. PARISH (Beckenham) thought that the apparent complete failure of γ-globulin in the treatment of measles indicates that its antibody content may not be so high as has been supposed. It would be worth preparing γ-globulin from convalescent measles serum in an attempt to produce a product effective in treatment. He noted with pleasure the statement that the troublesome jaundice-producing factor is eliminated by the selective heating of γ-globulin.

Reviews of Books

Science and Nutrition

(2nd ed.) A. L. BACHARACH, M.A. Camb., F.R.I.C., with a preface by Sir JACK DRUMMOND, D.SC., F.R.S. London: Watts. Pp. 142. 5s.

THIS book, first published in 1938, deserves its revised and partly rewritten second edition. It can profitably be read, as Sir Jack Drummond says, by the medical man and the politician as well as by the man and woman in the street, for it clearly shows how deficient diets may be at least as dangerous as infective agents. He quotes Brillat-Savarin's aphorism that the destiny of nations depends upon the way in which they nourish themselves. Mr. Bacharach summarises in simple and effective language the results obtained by nutritionists all over the world. Writing primarily as a chemist, he tells us how the nutritionist plans his experiments and evaluates his results. The five chapters on the vitamins give a useful summary of present-day views, and the book should relieve the general reader of much of the worry about his eating and drinking which his other reading may engender. Mr. Bacharach appears, however, to believe that, if the majority of the world's workers are given more money, or if the prices of foods are reduced, people will buy enough of the right kinds of food. Against this the U.S. National Research Council's committee on food habits has shown that food habits are not conditioned by economic factors alone. Any effort to change them must reckon also with social, psychological, religious, and other factors. Moreover, to provide the means of obtaining an optimal diet is not to ensure that it is actually eaten. One method of seeing that it is eaten is to remove all temptation and ability to buy the unbalanced diet—which is in effect what Britain did during the recent war. All things considered, however, we may come to prefer the slower but ultimately more effective process of education. For those who are willing to learn what they should eat, and why, Mr. Bacharach supplies helpful information.

A Study of Endometriosis

(2nd ed.) JAMES ROBERT GOODALL, M.D., D.SC., F.R.C.O.G., formerly professor of clinical gynæcology and obstetrics, McGill Univ., Montreal. London: Lippincott. Pp. 150. 35s.

THIS book has been written to bring the whole subject of endometriosis and allied diseases under one cover, and to add several new chapters on new work. So writes Professor Goodall in his preface, and thereby gives a brief description of his life's work. He is an enthusiast, and when in addition we know him to be a gynæcologist of experience, no mean clinician, an expert pathologist, an accurate observer, and a man with imagination, it is not surprising that he should produce a remarkable work. The reviewer of scientific books seldom has difficulty in laying them down, but some of the chapters in this one are so stimulating that they must be pursued to the end. A far wider field is covered than is suggested suggested in the modest title. The author indicates yet another approach to research into the causation of innocent and malignant new growths. His book will be of interest to all, but especially to the pathologist and gynæcologist. Much written therein will be disputed and more still will be criticised. But even if future investigations do not confirm some details of Professor Goodall's work, his ideas may lead to important discoveries.

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THE LANCET

LONDON: SATURDAY, JANUARY 19, 1946

Bombs on Germany

TOWARDS the end of the war the air attack on Germany came to be regarded by some as a background, if not as a subsidiary, to the land and sea campaigns. Its magnitude is emphasised by an official American account[1] of its effect on the health and medical care of the Germans. Whereas fewer than 61,000 people were killed in German air attacks on Britain, the Allied air-raids caused over half a million deaths in Germany—about as many as Britain and the British Empire sustained on all fronts in the whole war. In Hamburg during a single month (July, 1943) between 46,000 and 60,000 people were killed, which is considerably more than twice the number killed in the London county area in 1939–45. In the chaos of defeat, exact figures are unobtainable; records have been lost, and numberless bodies remain, unidentified, beneath the ruins of German cities. The chief causes of death, as might be expected, were direct hits by bombs or bomb fragments, burial under rubble, and fire; and the report places the main emphasis on fire. In incendiary raids burns were a less common cause than the inhalation of superheated air or poisoning by carbon monoxide, which is said to have accounted for as many as 80% of deaths in some raids. Engineers in Hamburg have estimated that the temperature in burning blocks rose as high as 800° C. (nearly 1500° F.). When the heat became intense, hundreds of people were seen emerging from shelters; they ran across the road and slowly collapsed as if utterly exhausted. Many who died in this way were afterwards found naked except for their shoes—either because flames suddenly spurted across the street and consumed the victims' clothing, or because the intense heat caused the clothes to dissolve without actual fire. Most of the bodies were not burned to ashes, but were dry and shrunken like mummies.

Considering the disruption of normal life in the cities, the people's health remained surprisingly good. Overcrowding, and recurrent damage to the water and sewage systems, are thought to have increased streptococcal infections, paratyphoid, diphtheria, and scabies; and in a series of bombed cities, selected as representative, the incidence of tuberculosis rose from 133 to 207 per 100,000 between 1933 and 1944. Yet though deficient sanitation, overcrowding, and fatigue may seem to have set the stage for widespread epidemics, there were none. The report suggests that their absence may be largely attributable to the Germans' devotion to personal hygiene; they have succeeded in keeping cellars and hovels clean and orderly in the midst of ruins untouched since the raids. Most German doctors have said that the raids did not lead to an increase in psychiatric illness. Though no authoritative statement has yet been made on the morale of civilians in the exposed cities, it appears that the people accepted their lot with little argument, for we have heard nothing of large disturbances or disorganised flights. It would surely be profitable to investigate the causes of this complaisance: what parts were played by belief in final victory, good discipline, fear, or apathy? It seems that casualties in war plants were no more frequent than among the general population; in fact, as attacks increased, a smaller proportion of people were killed at work. But the attacks did directly affect the industrial worker's health: they gave rise to irritability, nervousness, and deficient concentration, which in turn raised the accident-rate, and there was much upper-respiratory infection and some increase in pyogenic infections owing to employment under insanitary conditions. Absenteeism after raids was checked by rigorous measures.

During the war the German doctors had to do about twice as much work as in peace-time. In November, 1944, approximately 47,000 were serving a population of 66 million in Germany proper. Already before the war hospital facilities were antiquated and barely sufficient, and about a third of the hospitals in cities have since been destroyed. The damage to hospital buildings varied more or less with the importance as targets of the cities in which they stood. The quality of medical care in hospital was fairly well maintained, and by careful control of raw materials medical supplies were adequate till the last year of the war, when many drugs, including the sulphonamides and insulin, became scarce. The production of penicillin, of which the process was known, had reached only the experimental stage when it had to be abandoned; but it is stated that medical research was not impeded till the final year. As the end approached, the surgeon fared little better than the physician: instruments were hard to obtain; owing to shortage of textiles, moss was sometimes used as an absorbent dressing on wounds; and paper bandages were widely employed. Drug manufacture was concentrated in Berlin, Hamburg, and cities of the Ruhr and Rhineland; textiles were made mainly in Silesia, and glass in Thuringia. Thus the pharmaceutical industry was particularly vulnerable to Allied air attack on the transport system. The organisation was so highly integrated that a raid on one factory would often stop production in others by depriving them of essential materials. Except for the allocation of raw materials, medical supplies were not controlled until the phase of intensive attack started, and manufacturers attributed the final failure of supplies to neglect to arrange sufficiently early the control, dispersal, and rationing of stores, and the simplification of equipment and drugs, which were eventually needed. Last April it was reported to HITLER that 20% of all essential medical supplies had been destroyed; that 40% of those in stock were partially damaged and would last two months; and that the remainder would maintain the supply for four additional months if transportation could be restored. It is believed that, had the bombing continued for a few more months, German doctors could not have rendered the barest essentials of medical care, epidemics would have ensued, and the people would have been brought to the verge of starvation.

Seeking for lessons in the German experience, the

1. Report issued in Washington by the medical branch of the United States Strategic Bombing Survey, headed by Major Cortez F. Enloe, Jr., chief of the Army Medical Sciences Branch. Summary issued by U.S. Information Service, Inveresk House, Strand, London, W.C.2.

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report notes that unified direction of military and civilian health services proved necessary to assure medical care for the armed forces and the general public. Scrupulous personal hygiene did much to protect civilians from ill health. The ability of hospitals to maintain their function in the face of air-raids depended on their being distant from important targets, and independent of all outside sources for essentials such as lighting, food, and water, as well as on the protection they could offer patients.

Streptomycin

OF all the antibiotics so far discovered, streptomycin, isolated in 1944 by the American workers WAKSMAN, BUGIE, and SCHATZ,[1] promises after penicillin to be the most important. Combining low toxicity with a pronounced bactericidal action over a wide range of pathogenic bacteria, it gave every hope of being successful in infections caused by organisms insensitive to penicillin. In experimental studies on mice[2] infected with gram-positive or gram-negative bacteria, and on guineapigs infected with tubercle bacilli,[3] streptomycin showed clear evidence of chemotherapeutic activity in all cases. In the mouse experiments 100% recovery was obtained after inoculation with lethal doses of gram-negative bacilli, provided that sufficiently large amounts of streptomycin were administered. Equally impressive results were obtained in the guineapig experiments, inasmuch as there was little evidence of tuberculous disease developing after inoculation with human strains; nevertheless tubercle bacilli were subsequently recovered from the spleens of some of the animals treated with streptomycin. The results were comparable to those previously obtained in the treatment of guineapig tuberculosis with sulphone compounds such as promin.

It is therefore disappointing that in the few clinical trials yet reported streptomycin has not proved so successful as might have been expected. In the first clinical study, published by REIMAN, ELIAS, and PRICE,[4] very large amounts of the drug—as much as 4 million units[5] (10 g.)—were given each day parenterally for 7–12 days in five cases of typhoid fever. In two cases fever ended abruptly some days after the treatment began, and recovery followed in a manner which strongly suggested that the drug was responsible; in a third case there was a gradual decline in fever with recovery; in the fourth there was partial recovery followed by relapse when the drug was stopped; while in the fifth the drug exerted no appreciable effect. More recently HINSHAW and FELDMAN[6] have issued a preliminary report on the treatment of human tuberculosis with streptomycin at the Mayo Clinic. The drug did not seem to affect the lesions of chronic fibrocaseous tuberculosis, but extensive and progressive lung lesions tended to improve while the drug was being given, although cessation of treatment was in a few cases followed by renewed activity in the lesions. More encouraging results were obtained in renal and cutaneous tuberculosis, but too short a period had elapsed since the end of treatment for a final assessment.

Streptomycin is poorly absorbed from the gastro-intestinal tract, but intramuscular and intravenous injections are well tolerated and the drug is excreted less rapidly than penicillin. The greater part of it is excreted in the urine, and a concentration as high as 1330 units per c.cm. can be maintained by the parenteral injection of 2,000,000 units daily.[7] A concentration of 100 units per c.cm. should, in HELMHOLZ'S view, rapidly reduce the number of bacteria found in urinary infections, and the drug has been widely employed in America for the treatment of urinary-tract infections following cord lesions in Army personnel. No reports are yet available, but it is believed that the results are not entirely satisfactory. The drug is not devoid of toxicity to man, and HINSHAW and FELDMAN have reported one case of deafness and three cases of apparent damage to the vestibular nerve when streptomycin was administered for long periods. Streptomycin fails to pass the blood-brain barrier, but it can be administered intrathecally. When used in this country in cases of meningitis caused by gram-negative bacilli such as *Pseudomonas pyocyanea* the results were disappointing, although apparently adequate levels were maintained in the cerebrospinal pathways.

At the moment streptomycin is issued only for clinical trials, which are for the most part being carried out in America. In view of its large and somewhat unusual molecule it is unlikely to be synthesised in the immediate future; but, as it is easy to produce, some should soon be available in Britain.

Exploration of Muscle

BERNAL[8] has pointed out that the methods of investigating muscular contraction are so specialised that researchers in this field scarcely know what their fellows employing a different approach are doing. From time to time, however, the hypotheses suggested by one line of attack overlap fact as discovered by another, and where these are incompatible some mutual adjustment takes place. Microscopic analysis, with its sarcomeres and transverse membranes, and elaborate explanations of their changed relationships during contraction, has given way to the combined subtle verdict of the X ray and the robust fact of the chemist. The chemist says there is virtually nothing available but myosin out of which muscle fibrils can be made (though SZENT-GYÖRGYI[9] has found another fibre-protein, actin), and the X rays reveal that molecules of myosin can arrange themselves in chains which fit in very well with the X-ray appearance of actual muscle. The dark and light cross-striations, representing doubly and singly refracting segments of the fibrils, must mean that for a space the molecules are strung together in one way and then for a space in another way. Or perhaps the strings themselves are zigzagged, single or double refraction depending on

1. Waksman, S. A., Bugie, E., Schatz, A. *Proc. Mayo Clin.* 1944, **19**, 537.
2. Jones, D., Metzger, H. J., Schatz, A., Waksman, S. A. *Science*, 1944, **100**, 103. Heilman, F. R. *Proc. Mayo Clin.* 1944, **19**, 553. Robinson, H. J., Smith, D. G., Graessle, O. E. *Proc. Soc. exp. Biol. N.Y.* 1944, **57**, 226. Heilman, F. R. *Proc. Mayo Clin.* 1945, **20**, 33.
3. Feldman, W. H., Hinshaw, H. C. *Ibid*, 1944, **19**, 593.
4. Reiman, H. A., Elias, W. F., Price, A. H. *J. Amer. med. Ass.* 1945, **128**, 175.
5. The unit originally described by investigators at Rutgers University was that quantity of the dry streptomycin which would inhibit the growth of a given strain of *Bact. coli* in 1 c.cm. of nutrient broth or agar. Subsequent workers have adopted different but substantially equivalent standards.
6. Hinshaw, H. C., Feldman, W. H. *Proc. Mayo Clin.* 1945, **20**, 313.
7. Helmholz, H. F. *Ibid.* p. 357.
8. Bernal, J. D. Perspectives in Biochemistry, Cambridge, 1938.
9. Szent-Györgyi, A. *Bull. Soc. Chim. biol.* 1943, **25**, 242.

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the consequent orientation of the molecules with respect to the direction of the transmitted light. The undoubted coincidence of level between the dark and light bands in adjacent fibrils argues more than a conglomeration of simple molecular chains. Similarly strung molecules are joined laterally by side-chains, and probably the shape of the grids so formed is such that they fit together like a stack of spoons.

Contraction clearly involves some kind of almost instantaneous change in the shape of the molecules. They may, for instance, have a tendency on account of attraction between their own side-chains to curl up into rings, and yet normally be held out straight by the electrostatic field of the solutes surrounding them. Transformations of these solutes, which we dimly apprehend through the multitude of chemical changes[10] accompanying contraction, might change the electric field and permit the necessary change in shape. BINKLEY,[11] of the U.S. Naval Research Unit, suggests a more purely chemical explanation in which sulphydryl and hydroxyl groups on adjacent amino-acids condense to make a ring and shorten the molecule. The groups are ordinarily held apart by combination of the hydroxyl group with phosphate, which during contraction is removed to form adenosine triphosphate (A.T.P.). There is, however, some difference of opinion as to whether A.T.P. appears during the actual contraction or the subsequent relaxation,[12 9] while ASTBURY [13] associates the sulphur side-chains with the links between the main chains, and suggests that they may be temporarily ruptured during contraction. He postulates other, and superficially more attractive, types of ring formation to account for the actual shortening. Advances in X-ray diffraction studies [14] of muscle under the influence of various reagents must soon solve some of the structural problems. Meanwhile, SINGH [15] points out that since the condition of the molecular chains can be altered by their chemical environment, the capacity of smooth muscle to increase its tone with no increase in oxygen consumption may mean that its myosin is contracted by a more permanent " reagent " than the presumably labile ones which activate voluntary muscle and which require energy for their production or dissipation.

Another hypothesis which has been set up to tempt the specialist is a theory of the nervous initiation of contraction—the trigger without which voluntary muscle remains inert. Whatever the nature of the equilibria which determine relaxation and contraction, each nerve impulse switches its quota of fibrils from one to the other. In life, all muscles are in a state of " tone," [16] which means that the myosin molecules of every voluntary muscle fibril are all the time being switched open and shut several times a second. The muscle may not have time to relax completely between the impulses, and if these are more frequent than about 60 per second it remains fully contracted. The question arises whether the change in equilibrium is touched off by the establishment of an electrical potential around the nerve-ending or by the appearance there of a chemical substance. In the opinion of ECCLES,[17] chemical transmission becomes less important as we pass from autonomic effector organs to voluntary muscle, sympathetic ganglia, and central synapses. The excitation in sympathetic ganglia set up by stimulating preganglionic fibres is signalised by compound electrical potentials for which acetylcholine is partly responsible: its share in ganglionic transmission—a minor one—is defined.[18] In his hypothesis on the activation of voluntary muscle, ECCLES is concerned solely with a detailed picture of how the electrical phenomena accompanying the nerve impulse may set up electrical potentials in the adjacent part of the muscle-fibre intense enough to start a propagated wave of contraction. The avowed object of the hypothesis is that it offers a description of " electrical transmission " sufficiently definite to be tested. One of the most important results of the tests will be an evaluation (as in the sympathetic ganglion) of the part played by acetylcholine. It seems to be anticipated that this will have something to do with deciding the sensitiveness of the end-plate or neighbouring parts of the fibre to the fundamental electrical excitatory process. It will be recalled that the exposure of voluntary muscle to acetylcholine, if sufficiently intimate, will cause it to contract in the absence of nerve impulses,[19] and the action of drugs preventing the destruction of acetylcholine, such as 'Prostigmin,' is clinically well established. It is not too much to hope that in the near future we may see a reconciliation between various schools of thought on nerve-muscle physiology with the emergence of a story which, at all events in outline, can be understood by the comparative layman.

10. See Lovatt Evans, Starling's Principles of Human Physiology, London, 1945.
11. Binkley, F. *Science*, 1945, **102**, 477.
12. Sandow, A. *Trans. N.Y. Acad. Sci.* 1945, **7**, 139.
13. Astbury, W. T. *Trans. Faraday Soc.* 1938, **34**, 378.
14. Spiegel-Adolph, M., Henny, G. C., Ashkenaz, E. W. *J. gen. Physiol.* 1944, **28**, 151.
15. Singh, I. *Nature, Lond.* 1943, **152**, 132.
16. Sherrington, C. S. *Brit. med. J.* 1931, i, 207.
17. Eccles, J. C. *Nature, Lond.* 1945, **156**, 680.
18. Eccles, J. C. *J. Physiol.* 1944, **103**, 27.
19. Brown, G. L. *Ibid*, 1937, **89**, 12P.

Fresh Air in Railway Carriages

THE cheerful tone of our peripatetic correspondent who appeals this week for better ventilation in railway carriages may obscure the seriousness of his plea. No-one who travels, either regularly or occasionally, in the trains which carry Londoners to and from their work can doubt that the ordinary railway compartment, especially in its present overcrowded state, provides all the circumstances which the catarrhal organisms require to spread airborne infection, and is a main source of the minor illness that impairs efficiency and happiness for so many throughout the winter. The remedy is to hand—coaches of the all-one-compartment variety properly air-conditioned, warmed, and perhaps disinfected by aerosol or other methods. But the railway companies are in some respects conservative, and will almost certainly be replacing their outworn passenger coaches with ones of similar design unless a determined demand from their customers moves them to put considerations of health before tradition.

Air Vice-Marshal ANDREW GRANT has been appointed director-general of the Royal Air Force medical service in succession to Air-Marshal Sir HAROLD WHITTINGHAM who retires on Feb. 28.

THE next session of the General Medical Council will open on Tuesday, Feb. 12, at 2 P.M., when Sir Herbert Eason, the president will take the chair.

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Annotations

CHEMICAL WARFARE RESEARCH IN U.S.A.

THE remarkable British achievement of the discovery and development of B.A.L. (British anti-lewisite)[1] is far from being the only contribution to fundamental medical knowledge which has arisen from the study of chemical agents of warfare. As long ago as June, 1941—six months before Pearl Harbour—President Roosevelt set up a research organisation whose work, now summarised within the restrictions of the secret list by Oscar Bodansky,[2] has thrown new light on the action of the mustard group of compounds, lewisite, phosgene, the cyanides, and a new compound which inhibits the activity of cholesterinase.

The development of the nitrogen mustards since the first world war made it necessary to study their systemic and vesicant effects. Even very small amounts of them cause liquefaction necrosis of the cells of the lower layers of the epidermis, with exudation of fluid and the formation of intra-epidermal vesicles. A rational basis for the treatment of these was sought by studying the interactions between nitrogen mustards and various amino-acids and proteins, their action in vitro and in vivo on various enzyme systems, and the "mechanisms" of their skin penetration and effects on cell structures. As in the work which resulted in the discovery of B.A.L., the approach was fundamental rather than empirical. Although the treatment of mustard lesions suggested by these studies was less successful than the corresponding treatment devised for lewisite lesions, the basic biochemical knowledge obtained should be valuable to dermatologists and others concerned with vesication. The studies made of the effects of both the mustards and lewisite on the tissues of the eye should be especially valuable.

Another promising line of inquiry was opened by the British study of a group of compounds originally described by German chemists in 1932. At the laboratory set up in 1943 at Edgwood Arsenal, U.S.A., it was found that one of those compounds decreases the activity of cholesterinase in tissues and the blood. The symptoms which resulted when men and animals were exposed to low concentrations of this compound were not, with the exception of the miosis from which all the subjects suffered, serious; there was a feeling of constriction of the chest and a few subjects had rhinorrhœa, salivation, and diarrhœa. The serum cholesterinase, however, fell to about 1–5% of its normal value and Bodansky regards this degree of inhibition of a body enzyme as unprecedented. The return to normal was slow; in four days it reached about 30% of the normal, in eight days 50%, and in fifteen days about 70%. This protracted inhibition of cholesterinase suggested the use of the compound for the treatment of conditions such as myasthenia gravis in which a deficiency of acetylcholine at the myoneural junctions has been postulated. 'Prostigmin' is given for myasthenia gravis because it inhibits cholesterinase activity at the myoneural junctions and thus permits the accumulation there of acetylcholine with a resultant increase of muscular strength; but prostigmin must be given fairly often and it is hoped that the new compound will have a longer effect. It may also prove useful in glaucoma. Both these lines of investigation are being pursued in the United States.

The study of the effects of phosgene led to a detailed study of the mechanism by which it increases the permeability of the alveolar membranes of the lung; and the value of oxygen therapy has also been examined. Experiments showed that oxygen reduced the mortality from phosgene poisoning, and apparatus incorporating the army gas-mask face-piece was devised for the simultaneous administration of oxygen to 20 men. Finally, Bodansky describes the work done on the treatment of cyanide poisoning with nitrites. The nitrites (inhalation of amyl nitrite or intravenous injection of sodium nitrite and sodium thiosulphate) act by forming methæmoglobin in the blood, and there is evidence that this compound competes for the cyanide ion with the respiratory pigment ferricytochrome oxidase. The United States workers therefore inquired whether the deliberate production of methæmoglobinæmia, combined with the use of a gas-mask, would not protect the soldier against cyanide gases used in warfare. Substances were sought which would produce methæmoglobinæmia without other physiological effects and one compound was discovered which seemed to be suitable. This was used to produce methæmoglobinæmia in man and animals and studies were then made of the blood chemistry, the oxygen-dissociation characteristics of the blood, the capacity for work, and the effects on dark-adaptation and on the hæmopoietic, liver, and kidney functions. The levels of methæmoglobinæmia which are either embarrassing or fatal to animals were determined. The clinical applications of this knowledge are apparent when it is remembered that methæmoglobinæmia results from the administration of certain drugs and from the absorption of some toxic materials in industry. There are also cases of familial idiopathic methæmoglobinæmia.

These studies of cyanide poisoning may prove to have another valuable application. In 1918 Loevenhart reported that cyanide given to a schizophrenic patient caused a brief return to normal mental processes. Other work, and also the knowledge that the lethal effect of cyanides depends on their effect on the central nervous system, led the American workers to study the metabolism of brain tissue. The possibility of treating schizophrenia with cyanides is being followed up at various centres in the United States.

1. See leading article, *Lancet*, 1945, ii, 854.
2. *Science*, 1945, **102**, 517.

BONE-FORMATION IN APICAL LUNG SCARS

THE apical portion of the lung half concealed by the clavicle has a literature of its own. Clinicians exercising the art of auscultation and light percussion, radiologists pursuing an elusive shadow, and the morbid anatomists seeking the cause of adhesions have all found this region an interesting but frustrating study. Lately Davson[1] has been studying bone-formation in apical scars to determine whether these anthracotic subpleural apical pulmonary scars commonly found at autopsy are really the result of tuberculosis as many morbid anatomists in the past have assumed. The material for the investigation was derived from 130 nearly consecutive autopsies performed at the Manchester Royal Infirmary. As a result of careful microscopical examination Davson groups these scars into two classes—type A, in which definite evidence of tuberculosis is lacking, and type B, which present some evidence of tuberculosis.

From the 130 autopsies studied Davson obtained 14 type-A and 16 type-B scars. In type-A scars the essential histological features were fibrosis with varying accumulations of carbon and siliceous dust and a proliferated elastic fibre network within the area of the scar corresponding in outline with the original alveolar elastic network of the lung. In 12 of these scars, although there was no naked-eye evidence of them, microscopical examination revealed calcified foci and in some cases ossification. The structure was commonly that of woven bone, but where central bone-marrow formation had occurred lamellar bone could be seen in close relation to the marrow spaces. There was no definite evidence of osteoclastic resorption or calcified fibrous tissue, and it was not clear how the scar tissue had become converted into bone. In the type-B scars the striking point was the appearance of small hard pale yellow foci surrounded by well-defined greyish

1. Davson, J. *J. Path. Bact.* 1945, **57**, 171.

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rings of fibrous tissue which were again surrounded by pigment. Microscopically these yellow foci consisted of central masses of calcified necrotic tissue with a collagen fibre capsule which clearly divided the calcified mass from the rest of the lung tissue. Bone-formation, when it occurred, was usually of the lamellar type.

As a result of these intensive studies Davson summarises the differences between type-A (non-tuberculous) and type-B (tuberculous) scars as follows. Areas of calcification and ossification are usually recognisable macroscopically in type B scars but only microscopically in type A. Calcification in type B primarily involves a necrotic mass, whereas there is no obvious necrosis in type A, in which calcification occurs in small regular deposits. Bone-formation in type B begins at the periphery of the main calcified mass; in type A it is haphazard and may develop without previous calcification of fibrous tissue. The elastic mass network is fragmentary or absent in type-B areas of calcification or bone, whereas in type A this elastic network is intact and can be demonstrated within the area of calcification or ossification in direct continuity with the network outside. Davson also emphasises that osteoclastic resorption of a calcified matrix precedes bone-formation in type-B scars, whereas this is not so in type A. From Davson's present paper it is not easy to see why he assumes that one group of scars is tuberculous and the other is not; it would help if he would tell us whether there were further signs of healed tuberculosis in the lungs or elsewhere in the body.

A DIFFERENT KIND OF MATRON

MATRONS have always suffered under a double burden of responsibility and a divided loyalty. They have had to look after the well-being of both patients and nurses, and to combine the demands of nursing education with the need for getting the work done. Apart from the care of patients, the matron of a big teaching hospital with its hundreds of nurses carries an administrative and educational responsibility not less than that of a head of a women's college in a university. The Royal Victoria Infirmary, Newcastle-on-Tyne, has lately advertised the post of matron in unusual terms. The house committee wish the appointment to "offer new opportunities to someone who is anxious to advance nursing practice and nursing education, and for these purposes have arranged to relieve the matron of all duties within the hospital other than those directly related to nursing." They are asking for applications from a wide field, even from among those whose nursing experience is not recent, and from those with medical and other academic qualifications. The new matron is to have adequate technical, educational, and secretarial staff, and will be encouraged to "study in practice and by inquiry the needs of the patient on the one hand and the needs of the nurses on the other, so that new methods and standards of nursing may be kept constantly in mind throughout the hospital." She is to be given the opportunity to travel, and to keep abreast of modern advances in nursing and of educational methods in other fields.

This farsighted proposal has not excited unmixed enthusiasm from the nursing profession; there have been hints of a threat to the status of the hospital as a training school if a matron who is not a nurse should be appointed. The *Nursing Mirror*, however, with characteristic liberality, recalls that Florence Nightingale was not a trained nurse, and suggests that the answer to the question whether someone other than a trained nurse could make a success of a matronship such as this depends upon the woman. The infirmary committee do not imply that they intend to employ anyone who is not a nurse, and it may well be that many suitable candidates from the nursing profession will apply; but clearly if the experiment is to succeed the matron chosen must be the best person for the job, whether she is a nurse or not. The sympathy of THE LANCET with the nursing profession has never we hope been in doubt, and it would be to the credit of British nursing in our opinion if the right nurse could be found for the post. It is perhaps a weakness to be unwilling to learn from others outside our own profession—a weakness which it must be admitted doctors share. Nevertheless, it may be that nurses, like doctors, by the highly specialised nature of their training, are not necessarily the best people to master their own educational problems. To be accessible to new ideas is a sign of strength not of weakness. Some time ago we proposed that the Ministry of Health might send expert nursing teams to outlying hospitals to demonstrate modern nursing techniques. The comment of some senior nurses on this proposal was: "The sisters will never stand it; I shouldn't care to have strangers coming into my wards to demonstrate to me." May we suggest in a friendly way that this rejection of new opportunities can be stultifying? We hope that the nursing profession will see the Newcastle advertisement not as an attack on their unity but as the opportunity for a great nursing advance.

"CARBON 13"

ALTHOUGH it is customary to think of carbon as having an atomic weight of 12, it is now known that this element may be obtained in the form of at least five isotopes of atomic weights 10, 11, 12, 13, and 14. Only two of these, C^{12} and C^{13}, occur naturally; the others must be prepared artificially. Ordinary carbon, as it occurs in nature as the free element or in the form of its inorganic or organic compounds, consists of a mixture of 98·9% C^{12} and 1·1% C^{13}, and methods have now been devised in America for concentrating heavy carbon (C^{13}) and making it available for biological and medical research. One of the most important purposes for which it can be employed is to follow the steps by which one carbon compound is converted into another—e.g. the stages by which glycogen is built up in the tissues or by which fatty acids are broken down. To do this, substances containing a high concentration of C^{13} are synthesised for administration to animals or to human subjects, and the concentration of C^{13} in the possible products of intermediary metabolism, subsequently isolated from the tissues or excretions, is determined with the aid of the mass spectrograph. C^{13} can thus be used as a marker to label carbon compounds in the same way as the nitrogen isotope N^{15} is used to label amino-acids and proteins. By employing CO_2 labelled with heavy carbon it can be shown for example that urea can be formed in the tissues directly by the interaction of carbon dioxide and ammonia.

C^{13} has recently been used in investigating the mode of formation of the ketone bodies.[1] When octanoic acid containing C^{13} in the carboxyl group, $CH_3CH_2CH_2CH_2CH_2CH_2CH_2C^{13}OOH$, was incubated with liver slices, the acetoacetic acid subsequently isolated contained the labelled carbon equally distributed between the carbonyl and the carboxyl groups thus, $CH_3C^{13}OCH_2C^{13}OOH$. Such a compound could not be formed by direct oxidation of the octanoic acid, and it has therefore been suggested that the ketone bodies are formed by condensation of small units each containing two carbon atoms. To confirm this view, labelled acetic acid, $CH_3C^{13}OOH$, was incubated with kidney slices and the acetoacetic acid formed was found to be labelled in the carbonyl and carboxyl groups, showing that it had been produced by condensation of two acetic acid molecules.[2]

Of the radioactive isotopes of carbon, C^{10} has a half-life of only 8·8 seconds and is therefore of little use as a tracer, but C^{11} with a half-life of 21 minutes has been

1. Weinhouse, S., Medes, G., Floyd, N. F. *J. biol. Chem.* 1944, **155**, 143.
2. *Ibid*, 1945, **157**, 751.

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employed in short-term experiments on respiration. The most important radioactive isotope, however, is C^{14} which is formed when C^{13} is bombarded with neutrons in a cyclotron. It has a half-life of 1000 years and shows promise of being even more important than C^{13} as a marker for following the changes undergone by carbon compounds in the tissues. It has already been employed to demonstrate that the carbon of glycogen may be derived from sodium bicarbonate, butyric acid, propionic acid, and glycine.

LONDON PRIDE

IN his interim report [1] on the health of London, briefly summarised in our last issue, Sir Allen Daley pays a well-earned tribute to the courage and devotion to duty throughout the war of the staffs of the medical, nursing, and auxiliary services of the L.C.C.; but even to English eyes his opening sentence must seem somewhat of an understatement. "Nineteen hundred and forty-four," he says, "was a trying year for Londoners." For the ordinary citizen, 1944, the culminating year of a series of hard war years, was perhaps rather more than trying. It needs little imagination to appreciate how much trial of mind and body was entailed in the destruction of 29·7% of the homes of East London. It is all tabulated in the report with cool precision—air-raid casualties for each war year, grouped sadly but inevitably from age 0–1 on. Yet in the same columns of figures is told a story of confidence in their individual and national future of which any Londoner may well feel proud.

From the wealth of statistical data presented in Daley's report, some of the salient features have been collected in tables I and II. The most striking measure of the stress of war is given in the first column by the air-raid death-rate. The remaining columns must be reviewed against the background which it provides. The resilience of morale should be gauged less by the rising marriage-rate of the early war years than by the willingness to have children even in adverse circumstances which is reflected in the rising birth-rate. This apparent confidence in the future was also evident in the rising birth-rate among the occupied countries of Europe, in contrast to the opposite trend in the first world war. Significantly enough, the major exceptions to this upward trend in 1944 were Germany and Hungary. The corollary of this index of morale is seen in the steady fall in the suicide-rate during the same period.

TABLE I—RATES PER 1000 PER ANNUM

Year	Air-raid deaths	Marriages	Births	Suicides
1939	0·00	27·1	13·0	0·15
1940	2·59	34·5	15·0	0·17
1941	2·00	30·2	14·6	0·12
1942	0·04	27·6	16·9	0·12
1943	0·21	21·7	18·0	0·10
1944	1·85	21·5	18·1	0·10

As would be expected, however, the health of Londoners was not left unscathed by the effects of war. The indication of social wellbeing given by the pre-war fall in infant mortality has registered a check. In 1941, "the winter of our discontent," it reached a maximum of 57 per 1000 live births. This was the result, at least in part, of the malnutrition and overwork which raised the tuberculosis-rate and the overcrowding which caused a parallel move in the incidence of cerebrospinal fever. As table II shows, all three are now diminishing in satisfactory unison. The one discordant ominous note is sounded by the continued persistent rise in mortality of young children from diarrhœa and enteritis. In 1944 enteritis was three times more dangerous to infant life than whooping-cough, its nearest competitor.

TABLE II

Year	Infant mortality*	Deaths from pulmonary tuberculosis †	Cerebro-spinal fever notifications	Deaths from diarrhœa and enteritis (ages 0–2)†
1939	47	0·70	0·04	8·4
1940	48	0·87	0·27	6·1
1941	57	1·10	0·30	6·3
1942	50	0·90	0·14	8·0
1943	51	0·88	0·09	9·9
1944	51	0·84	0·08	9·6

* Deaths per 1000 live births.
† Deaths per 1000 per annum.

Comparisons are admittedly odious, and international comparisons of vital statistics notoriously so; yet the contrast with the New York experience cited in the report re-emphasises the need for the research now to be undertaken by the medical staff of the L.C.C. The consistent rise in the later stages of the war and the high incidence in areas which have borne the brunt of air warfare under conditions which even before the war could hardly be described as salubrious, suggest the cumulative effect of adverse factors affecting the environmental hygiene of the London infant. Perhaps these factors are not the major social evils which underlie tuberculosis and the air-borne infections. It is more likely that they are the multitudinous minor ills which harass the wartime mother, often both housewife and worker, and make the care of her children so much more difficult. If, however, these factors can be isolated and dealt with in the spirit which was displayed in war, London will certainly have another legitimate reason for pride.

THE NATIONAL HEALTH SERVICE

LAST week the Minister of Health met the Negotiating Committee which represents the principal medical organisations, and gave the members an outline of his proposals for a National Health Service. He is meeting the committee again, and is also putting his plans before spokesmen of the local authorities, voluntary hospitals, dentists, pharmacists, and others concerned. On another page our correspondent "Medicus, M.P." suggests that the new National Health Service may come into being in 1948, and discusses some of the problems that will arise in the meantime.

Prof. F. E. TYLECOTE, F.R.C.P., has been appointed chairman of the public health committee of the Association of Municipal Corporations in succession to Sir George Martin.

"... Any educated man could understand Lyell's *Principles of Geology* or Darwin's *Origin of Species*. Modern innovations in science on the other hand appear in works that only experts can follow. Poetry and music, no less than painting and natural science, make increasing demands upon those who seek to understand them; one may regret the fact, as Mrs. Partington regretted the Atlantic, but it is useless to follow her example and deny it. It is not Lord Keynes's fault that only experts can read his great book; his command of language is not inferior to John Stuart Mill's, but what he has to say is far more complicated. The chief moral to be drawn is that the world is very full of things that are very difficult to understand; and that if we do not understand something it is sensible either to try to learn or to keep quiet."—ROGER MARVELL, *New Statesman*, Jan. 5, 1946, p. 7.

1. Interim report of the County Medical Officer of Health and School Medical officer for the year 1944. Published by the L.C.C. Obtainable from P. S. King and Staples, Ltd., 14, Great Smith Street S.W.1. 1s. 6d.

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Special Articles

CROYDON OBSTETRIC SERVICE

RESULTS IN 18,600 BOOKED DELIVERIES

RUFUS C. THOMAS
F.R.C.S.E., M.R.C.O.G.

ASSISTANT MEDICAL OFFICER OF HEALTH FOR OBSTETRICS AND OBSTETRIC CONSULTANT, COUNTY BOROUGH OF CROYDON

THE Royal College of Obstetricians and Gynæcologists has recently published its *Report on a National Maternity Service*. In the section dealing with maternal mortality the report makes the following statement: "The integration of institutional, domiciliary, antenatal and consultant services has had a notable effect on the maternal mortality of those boroughs that have planned on those lines (e.g., Croydon, Luton . . .)."

During the past eight years the scope of the Croydon Obstetric Service has become progressively wider, the integration of its institutional, domiciliary, antenatal, and consultant services has had sufficient time to become consolidated, and the number of booked deliveries has reached a figure large enough to justify conclusions on the results. The aim of the obstetric scheme of the county borough has been described by Dr. O. M. Holden, M.O.H., in his clinical report for 1938 as "the ideal of complete antenatal, natal, and postnatal supervision under the same specialist obstetrician." The service became completely comprehensive in 1937. In July, 1937, following the Midwives Act, 1936, a domiciliary midwifery scheme was started, its clinical work being integrated with that of the service as a whole; in November, 1937, the work of St Mary's Maternity Hospital also came completely under the clinical control of the borough obstetrician. The figures which follow comprise the booked deliveries after the 28th week of Mayday Hospital maternity department and the domiciliary midwifery service during the period July 1, 1937, to June 30, 1945, and of St Mary's Maternity Hospital from Nov. 1, 1937, to June 30, 1945.

From 1937 onwards, the scope of the service has steadily grown until it now deals with about three-quarters of the total births in Croydon. The figures for 1943 show that of a total of 3785 live- and still-births allocated to the borough, 2876 were dealt with by the service. In addition, about 200 patients were referred by nursing-homes and independent midwives for antenatal supervision or specialist opinion, and about 50 cases were seen by the obstetrician in consultation with their own doctors. These numbers do not include abortions and ectopic gestations, of which about 200 are dealt with yearly, chiefly as emergencies. It may be said that 85% of the expectant mothers of Croydon in 1943 came, at one time or another, under the clinical influence of the service. The work of the service must, therefore, have a considerable bearing on the maternal mortality, stillbirth, and neonatal death-rates of the borough as a whole. The obstetric services provided by the county borough have been described by Dr. Holden in his 1938 report, and by Thomas (1940). The table shows the numerical details of 18,632 booked patients delivered after the 28th week during the period under review.

Year	Mayday Hosp.	St. Mary's Hosp.	Domiciliary	Total
1937	475	89	180	744
1938	825	490	886	2204
1939	815	451	994	2260
1940	786	489	935	2210
1941	616	579	730	1925
1942	960	561	1153	2674
1943	1097	611	1072	2780
1944	1033	541	991	2565
1945	496	292	485	1273
	7103	4103	7426	18,632

Among these 18,632 mothers, there were 190 sets of twins. The total number of infants delivered was therefore 18,822. The incidence of twin pregnancy is almost exactly 1%. There were no triplets.

MATERNAL DEATHS

Among the mothers, 14 died after delivery. In addition, 3 mothers died undelivered. The 17 deaths gives an overall uncorrected maternal mortality of 0·9 per thousand total births. The causes of these deaths are briefly given below:

DEATHS AFTER DELIVERY IN HOSPITAL (12)

1. Acute yellow atrophy. Forceps delivery. Macerated hydrocephalic fœtus.
2. Cæsarean section. Pulmonary embolism on 11th day.
3. Postrheumatic mitral stenosis. Collapse after cæsarean section.
4. Myocardial degeneration and obesity. Died under anæsthetic during forceps delivery.
5. Myocardial degeneration and obesity. Sudden death after spontaneous delivery.
6. Severe antenatal varicosities. Forceps delivery. Thrombosis of internal saphenous vein. Pulmonary embolism on 14th day.
7. Trial labour. Cæsarean section. Peritonitis.
8. Cæsarean section. Pulmonary embolism.
9. Myocardial degeneration and obesity. Cæsarean section for maternal and fœtal distress. Progressive cardiac failure.
10. Trial labour. Cæsarean section. Abdominal sepsis.
11. Obesity, endocarditis, coronary atheroma, calculous cholecystitis. Forceps delivery for maternal distress. Postpartum hæmorrhage. Manual removal of placenta and blood-transfusion.
12. Acute lobar pneumonia and empyema. Died on 6th day of illness, just after delivery of premature infant (4¾ lb., spontaneous).

DEATHS UNDELIVERED IN HOSPITAL (3)

13. Eclamptic fits during first stage of labour. Died during second convulsion. Autopsy showed spontaneous rupture of uterus.
14. Concealed and revealed accidental hæmorrhage. Couvelaire uterus. Died 3 hours after admission, in spite of blood-transfusions.
15. Congenital heart disease, mitral and tricuspid stenosis, sudden collapse at 30th week. Autopsy showed cor bovinum.

DEATHS AFTER DELIVERY AT HOME (2)

16. Twin pregnancy. First baby born spontaneously. Prolapse of second cord. Forceps delivery of second child. Retained placenta, postpartum hæmorrhage. Died before blood-transfusion could be given.
17. Spontaneous delivery. Pelvic thrombosis. Pulmonary embolism. Small piece of placental tissue found in utero at autopsy.

Maternal deaths are classified by the Registrar-General under two headings: (*a*) directly due to pregnancy; (*b*) not directly due to, but associated with, pregnancy. Of the 17 deaths, 10 were unquestionably directly due to pregnancy (nos. 1, 2, 6, 7, 8, 10, 13, 14, 16, and 17). This gives a maternal mortality directly due to pregnancy of 0·53 per thousand total births. Of the remaining 7 women, it is noteworthy that 6 were the subjects of cardiac disease. Three were cases of obesity with myocardial degeneration (nos. 4, 5, and 9). A fourth had combined endocardial and myocardial disease and advanced coronary atheroma, with obesity and calculous cholecystitis. The other two were the subjects of valvular disease, one acquired (no. 3), the other congenital (no. 15). Lastly, the patient who died from a pneumococcal pulmonary infection came into labour on the last day of the illness. Labour was premature and easy, and did not have any influence on the ultimate issue. The maternal mortality from causes associated with, but not directly due to, pregnancy is 0·37 per thousand total births.

STILLBIRTHS AND INFANT DEATHS

Out of 18,822 infants delivered, 416 were stillborn. The stillbirth-rate is therefore 22·1 per thousand total births.

In computing the neonatal deaths, it must be explained that, as a rule, women booked for home delivery who come into labour very prematurely—i.e., earlier than the 37th week—are admitted to hospital for delivery, and that infants born at home whose condition at or after birth is not good are also admitted to hospital with their mothers. Deaths among these babies are included in the hospital figures. The number of infants who died in hospital during the first 21 days (including those admitted after domiciliary delivery) was 228. In addition, 33 infants died at home while the midwives were in attendance—i.e., during the 14 days of the puerperium. The

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total number of infant deaths according to the above standard, therefore, was 261 out of 18,406 live births. The neonatal mortality is 15·2 per thousand live births.

COMPARATIVE STATISTICS

It will be of interest to compare the maternal mortality, and stillbirth and infant death-rates, for the complete years 1938–43 inclusive, of England and Wales and the county borough of Croydon as a whole, with the results in the booked cases of the Croydon Obstetric Service. The figures for maternal mortality for England and Wales, and for the county borough of Croydon, are taken from the returns of the Registrar-General. Those for the stillbirths and neonatal deaths for England and Wales were published by Stocks (1944), and for the county borough of Croydon from the Registrar-General's returns, and the annual reports of the M.O.H. for Croydon.

Year	MATERNAL MORTALITY			STILLBIRTHS			NEONATAL DEATHS		
	England and Wales	Croydon C.B.	Croydon Obst. Serv.	England and Wales	Croydon C.B.	Croydon Obst. Serv.	England and Wales	Croydon C.B.	Croydon Obst. Serv.
1938	2·97	0·87	0·4	38·3	28·0	22·2	27·2	17·0	12·0
1939	2·93	1·16	0·4	37·8	31·0	28·3	27·0	23·0	14·8
1940	2·16	0·99	0·45	36·1	28·0	20·9	27·8	19·0	9·1
1941	2·23	3·24	2·1	34·4	25·0	21·3	27·5	18·0	11·5
1942	2·01	3·35	1·47	33·0	30·0	23·6	26·1	22·0	15·1
1943	2·29	0·53	0·7	30·2	29·0	23·4	24·5	22·0	15·7
Avor.	2·43	1·69	0·92	34·9	28·5	23·3	26·6	20·0	13·03

In comparing the neonatal mortalities it must be remembered that the figures for England and Wales and for the county borough of Croydon are calculated for deaths in the first month of life, whereas the figures for the Obstetric Service are for the first three weeks. A study of the vital statistics tables relating to neonatal mortality within the first month of life for the county borough of Croydon, for the years being compared, shows that of these deaths, 92% occurred within the first three weeks. The basis for comparison is therefore fairly close.

ABNORMAL CASES

Breech presentation.—There were 476 breech deliveries, an incidence of 1 in 39, or 2·5%. There was no maternal mortality.

Forceps delivery.—The number of infants delivered by forceps was 850, an incidence of 1 in 23, or 4·3%. Three mothers died, 2 after delivery in hospital, and 1 after delivery at home.

Cæsarean section was performed on 301 patients, an incidence of 1 in 61, or 1·6%. The lower segment section was the operation of choice, being carried out on 243 occasions. Six mothers were lost, a maternal case-mortality of 1·96%.

Placenta prævia.—There were 118 cases. Of these, 22 in which the placenta was central and 12 in which it was marginal were treated by cæsarean section. The remainder were treated by artificial rupture of the membranes, with the application of vulsellum forceps to the fœtal scalp when required to control bleeding. There was no maternal mortality.

Abruptio placentæ.—There were 81 cases. The general treatment consisted of sedatives, treatment of shock and blood-loss by blood-transfusions, followed by artificial rupture of the membranes where necessary. One patient died undelivered, a maternal case-mortality of 1·2%.

Toxæmia.—Included under this heading are all patients admitted with albuminuria and/or hypertension. The numbers therefore include all cases of pre-eclamptic toxæmia, eclampsia, essential hypertension, and acute pyelitis of pregnancy. The total number admitted was 1427, there being 152 cases of acute pyelitis. Ten patients developed eclampsia. One patient died undelivered (no. 13 in the list of deaths).

The low incidence of eclampsia is noteworthy, and is partly accounted for by our practice of inducing labour at the optimum moment, when further treatment is thought to be unwise from the mother's point of view in regard to her future health, or where eclampsia is thought probable if the pregnancy was allowed to proceed further. Most of the fits which did occur were of the postpartum variety.

Spontaneous rupture of uterus.—There were 2 instances, one of which has been described in the notes of maternal deaths.

The other was a patient who had had a classical cæsarean section performed 8 years previously, and had attended our clinic from the 12th week of the present pregnancy. She had been well until the 32nd week, at which time she was admitted to Mayday Hospital four hours after having collapsed at home. At laparotomy, a fœtus of 4 pounds, with the placenta, surrounded with blood-clot, was found in the abdominal cavity, and about 2 pints of free blood. The uterus was split from top to bottom, and turned completely inside out. A rapid hysterectomy was performed, and 2 pints of saline poured into the abdominal cavity before closure. She improved rapidly after blood-transfusion, and made an uninterrupted recovery.

Ruptured rectus abdominis muscle.—A case of this interesting complication was treated in 1945, and will be reported shortly. The patient recovered after evacuation of about 1½ pints of clot and ligature of branches of the deep epigastric artery.

DISCUSSION

The Obstetric Service is fully comprehensive in its scope, providing an inpatient and domiciliary midwifery service, the whole of which is completely integrated, and under the direct clinical control of a whole-time specialist obstetrician. The services of the obstetrician are available to the practitioners in the borough, and antenatal supervision of the cases of independent midwives and nursing-homes is also undertaken, several hundred expectant mothers in this class being dealt with each year. The aim of the service has been to encourage the closest coöperation with all engaged in the practice of obstetrics in the borough.

A service modelled on similar lines would be suitable to the needs of any county borough or borough of population up to 250,000. For smaller boroughs, it is only necessary to adjust the number of personnel to suit the smaller needs. That such a service should be under the clinical control of a single specialist has great advantages. As the antenatal supervision of both inpatients and outpatients is under his direct control, all abnormalities from both sides can be brought to his notice with the minimum of delay. Cases originally booked for domiciliary delivery who may be found later in pregnancy to be more suitably delivered in hospital can have the necessary accommodation provided immediately, their further supervision being undertaken on the inpatient side of the clinic. If during the course of a domiciliary delivery unexpected complications arise, the case can be admitted to hospital without delay. This is particularly important in cases of antepartum or postpartum hæmorrhage, for whom accommodation is always available at a moment's notice. If resuscitative measures are needed, the emergency flying squad, with all the apparatus for blood-transfusion and other treatment, goes out, and, after the patient's condition has been sufficiently restored, brings her into hospital. A further point about the supervision of the domiciliary cases is that the midwives attend and take part in the work when their own patients are being examined, and hear the results of each examination, together with any instructions which may be found necessary. In such ways an endeavour is made to provide for all eventualities.

SUMMARY

The results of 18,632 booked deliveries after the 28th week dealt with in the eight years to June 30, 1945, by the Croydon Obstetric Service are recorded.

The number of infants delivered, including 190 sets of twins, was 18,822.

Of the mothers, 14 died after delivery, and 3 died undelivered. A short history of each fatal case is given.

The maternal mortality according to the classification of the Registrar-General is: directly due to pregnancy, 0·53; associated with pregnancy, 0·37; total (all causes) 0·9 per 1000 total births. The stillbirth-rate was 22·1 per 1000 total births, and the infant death-rate 15·2 per 1000 live births.

Acknowledgements are due to Dr. Oscar M. Holden, M.O.H. for Croydon, for permission to publish these results, and for access to and permission to quote from his official reports regarding neonatal mortality-rates.

References.—Stocks, P. (1944) *Lancet*, ii, 65.
Thomas, R. C. (1940) *Brit. med. J.* i, 562.

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NEW YEAR HONOURS

PUBLICATION of the New Year honours was completed on Jan. 9. The names of the following medical men and women should be added to the list which appeared in our issue of Jan. 5.

Knight Bachelor

HAN HOE LIM, C.B.E., M.B. Edin.
For public services in the Straits Settlements.

C.B.E. (Military)

Air Vice-Marshal KENNETH BIGGS, M.C., M.R.C.S.
Air Vice-Marshal DUNCAN MCLAREN, M.B. Glasg.
Air-Commodore F. J. MURPHY, M.B. Dubl.
Group-Captain V. R. SMITH, M.R.C.S.
Air-Commodore W. J. G. WALKER, M.R.C.S.

O.B.E. (Military)

Group-Captain J. F. BROMLEY, M.B. Manc., M.R.C.P.
Group-Captain A. F. COOK, L.R.C.P.I.
Squadron-Leader W. L. JAMES, M.R.C.S.
Colonel H. A. MOFFATT, D.S.O., F.R.C.S., S.A.M.C.

O.B.E. (Civil)

Prof. SAUL ADLER, M.B. Leeds, M.R.C.P.
Head of the department of parasitology, Hadassah University; for services to the Forces.

PERCY REGINALD BOLUS, M.B. Lond.
Director of medical services, Ministry of Pensions.

JOHN LAIRD MCKENZIE BROWN, M.R.C.S.
Medical officer for civilian defence, Metropolitan Essex.

WILFRED SAMUEL HAMILTON CAMPBELL, M.B. Edin.
County medical officer, Lincolnshire (Lindsey) county council; for services to civil defence.

DOUGLAS HENRY COLLINS, M.D. Lpool.
Medical superintendent, Wharncliffe Emergency Hospital.

Mrs. MARY AYLWIN COTTON, M.B. Lond.
Principal, Foreign Office; recently employed in the Ministry of Economic Warfare.

ALEXANDER MILLAR MEEK GRIERSON, M.D. Edin.
Senior assistant medical officer, Manchester; for services to civil defence.

LESLIE GEORGE HOUSDEN, M.D. Lond.
Chairman of the mothercraft training subcommittee, National Association of Maternity and Child Welfare Centres.

JOHN JEFFREY, M.D. Edin., F.R.C.S.E.
Hospital officer, Aberdeen, Department of Health for Scotland.

JAMES JOHNSTONE, M.B. Glasg.
Medical superintendent, Hairmyres Hospital, Lanarkshire; for services to civil defence.

Major A. C. W. KNOX, M.C., M.B. Aberd.
Assistant commissioner, No. 1 district, St. John Ambulance Brigade.

IAN HYSLOP MCCLURE, M.B. Edin., F.R.C.S.E.
Consultant surgeon, county of Orkney; for services to civil defence.

WYLIE MCKISSOCK, M.S. Lond., F.R.C.S.
Surgeon-in-charge, neurosurgical centre, Atkinson Morley Emergency Hospital, Wimbledon.

HENRY JOHN NIGHTINGALE, M.S. Lond., F.R.C.S., J.P.
Senior surgeon, Royal South Hants and Southampton Hospital, Emergency Medical Service.

WILLIAM POWELL PHILLIPS, M.R.C.S.
Deputy medical officer of health, Cardiff; for services to civil defence.

THOMAS POOLE, L.R.C.P.E.
Lately medical officer in charge, military prison and detention barracks, Riddrie, Glasgow.

SYDNEY CLIFFORD PRITCHARD, M.D. Edin.
Medical officer in charge, Hornsey Central Hospital, Emergency Medical Service.

STEPHEN JOHN SCURLOCK, M.C., M.D., M.S. Lond.
Medical superintendent, Ministry of Pensions.

IAN SCOTT SMILLIE, M.B. Edin., F.R.C.S.E.
Orthopædic surgeon, Scottish Emergency Medical Service.

BRYCE MCCALL SMITH, M.B. Edin.
Medical superintendent, Victoria Infirmary, Glasgow; for services to civil defence.

THOMAS EDWIN PRYCE-TANNATT, M.B. Lond.
Inspector of Salmon and Fresh Water Fisheries, Ministry of Agriculture and Fisheries.

GEOFFREY SYDNEY TODD, M.B. Sydney, F.R.C.P.
Medical superintendent, King Edward VII Sanatorium, Midhurst; for services to civil defence.

Miss BEATRICE ETHEL TURNER, M.B. Lond., F.R.C.S.E., F.R.C.O.G.
Consultant obstetrician, Shardeloes Emergency Maternity Hospital, Bucks.

JOHN THEODORE WHITLEY, M.B. Manc.
Assistant commissioner, Essex, St. John Ambulance Brigade.

M.B.E. (Military)

Squadron-Leader W. O. BAIRD, M.R.C.S.
Squadron-Leader F. J. HALLINAN, M.B. N.U.I.
Flight-Lieutenant K. M. HAY, M.B. Camb.
Flight-Lieutenant A. F. LANG, M.B. Edin.
Squadron-Leader K. A. W. LAW, M.B. Durh.
Wing-Commander DAVID STEVENSON, M.D. Edin.

M.B.E. (Civil)

Captain C. A. BATHFIELD, G.M., M.R.C.S.
Station medical officer, Air Transport Auxiliary.

WILLIAM FUNSTON BRYSON, M.B. Belf., D.L.
Secretary, Enniskillen hospitality committee.

Mrs. GLADYS ANYAN DANBY, L.M.S.S.A.
County superintendent, Somerset, St. John Ambulance Brigade.

Miss MARGARET HOLLIDAY, F.R.C.S.I.
Resident medical officer, Maternity Hospital for the Wives of Officers, Fulmer Chase, Bucks.

JOHN INGRAM, M.B. Aberd., J.P.
Medical practitioner, camp reception station, St. Agnes.

PHILIP INWALD, M.B. Lond.
Medical officer in charge, civil defence mobile first-aid unit, Islington.

Miss EMMA MARY JOHNSTONE, L.R.C.P.E.
Lately medical officer in charge of mobile civil defence and post, Westminster.

Mrs. ETHEL WINIFRED LEE, M.B. Glasg.
County borough organiser, Hastings, Women's Voluntary Services.

JOHN WILLIAM PARKS, M.D. Camb.
Assistant medical officer, General Post Office.

Rai Bahadur RAM SWARUP SRIVASTAVA
Civil surgeon retd, Dehra Dun, United Provinces.

A.F.C.

Wing-Commander J. R. CELLARS, M.B. St. And.

Kaisar-i-Hind Medal

JAMES WILLIAM BOTTOMS, M.B. Lond.
Medical missionary, Baptist Mission Hospital, Chandraghona, Chittagong Hill Tracts, Bengal.

Miss MADELINE SHEARBURN, M.B.E., M.B. Durh.
Doctor-in-charge, Mission Hospital, Tank, North-West Frontier Province.

THE MALE NURSE

THE Minister of Health has decided that we should be making more use of male nurses in our hospitals, not merely to ease the present difficulties, but as a permanent policy. This is a principle which has long been supported in our columns: male nurses have been noted for much good work in mental hospitals, and there is every reason why they should be employed freely in the male wards of other types of hospital. Moreover, the grade of assistant nurse should offer opportunities to men who have trained as nursing orderlies in the Forces, and who, while wishing to go on with nursing as an occupation, do not feel able or willing to qualify for the State register.

The Minister has this idea in mind and suggests (circular 2/46) that some of those now leaving the Forces might be enrolled as assistant nurses forthwith, if their experience is suitable. Others may be eligible to take the State examinations without further training, and others may be willing to work for State registration. He wishes that all general hospitals with training facilities should consider whether they can establish complete training schools for male nurses. If this is not possible they might become affiliated schools, or training schools for male assistant nurses.

All local authorities willing to employ male nurses are asked to let the appointments office of the Ministry of Labour know the additional numbers of male nurses in the different grades whom they could accept. Since male nurses are usually non-resident it will not be necessary as a rule to provide additional quarters for them beyond cloakrooms and a common-room; but the Minister of Health will consider minor schemes of alteration to provide such necessary accommodation.

A BILL for the establishment of a tuberculosis authority has been presented to the parliament of Northern Ireland. The authority, which is to consist of 13 representatives of county and county-borough councils and 4 nominees appointed by the ministry of health, is to take over the present functions of councils in relation to tuberculosis. Maintenance costs are to be shared by the government and local authorities, and the cost of capital expenditure is to be borne by the government.

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In England Now

A Running Commentary by Peripatetic Correspondents

"The vile prison of afflicted breath."
SHAKSPEARE, *King John*, Act III, Sc. IV, 19.

A HUNDRED years ago a contributor to the *Quarterly*, inveighing against the vitiated atmosphere of London drawing-rooms, concluded his observations with the following passage:

"Everybody present knows that outside the plate-glass windows of the rooms in which we are suffering there is at this moment in waiting, not two inches from us, an overwhelming supply (which might be warmed) of pure air, just as desirous to rush in as the foul air we have been breathing and rebreathing is eager to rush out."

How far have we advanced since then in the application of scientific knowledge to ventilation? Every morning and every evening I have to spend an hour or so in a little box provided by a railway company, shut up with nine, or even a dozen, other people. Let us be fair and take the lower figure as representing the normal seating capacity. This wooden box measures 7 feet 10 inches in one direction and 5 feet 3 inches in the other; and its average height is about 7 feet. Let us say in our generosity that the space would contain 300 cubic feet, if the box were empty. But the box isn't empty. There is a thick cushioned squab on each side, leaving a gap of only 12 inches for the insertion of the passengers' legs, and a primitive heating coil under the seat. We have also to calculate the displacement of ten adults with their cases and parcels. The noses of those who sit opposite each other are less than 4 feet apart.

The box is usually sealed, and in this condition has an average temperature up to 90° F. and a relative humidity of 100 per cent. There are, however, six windows (each measuring approximately 2 ft. 6 in. × 1 ft. 11 in.) which create a localised icy downdraught, while the heater (12 in. behind my heels) provides ideal conditions for the eruption of chilblains. When the door (6 ft. 6 in. × 1 ft. 11 in.) is opened, our first sensation is one of relief; but the temperature falls rapidly to 32° F. And when Mrs. Jewkes leans out of the window talking to her friend—"Well, goodbye, dear; I'll see you at Oxford Circus at 11 o'clock tomorrow. Isn't it perishingly cold?"—I have on occasion recorded 7 degrees of frost.

Even this is not the whole story. Of the ten bodies above mentioned six are uttering products of imperfect combustion in clouds, containing (I am told) masses of tarry carbon particles, 6–8% of CO, and quantities of NH_3, pyridine, and other noxious matter of organic origin. These give rise to headache, tremors, palpitations, upset of bowel rhythm, amblyopia, and extrasystoles. Three other passengers are sneezing at short intervals, one of them straight into my face; and several of the smokers cough as a normal routine, whether they have colds or not. The compartment has vestigial traces of ventilators, but they never were any good, and they have not been in working order for years.

Now it is incontrovertible that disease-producing bacteria are emitted from the respiratory tracts of the occupants. It has been calculated that during a single sneeze something like 20,000 droplets are expelled with a muzzle velocity of 150 feet per second. Their diameter varies from 10μ to over 1 mm. Even the larger droplets, bearing an incredible number of germs, fall in a curved trajectory and do not reach the ground within 15 feet. (Let me remind you that the noses at risk are less than 4 feet apart.) The smaller droplets become converted into nuclei which behave much like particles of smoke and penetrate into every nook and cranny of our being.

It follows that the air of this foul cell is choked with lively and eager bacteria, many of them derived from persons who are manifestly in an infectious condition. It is small wonder that we go on picking up colds and other infections in trains and taking them home to our wives and families. If a person coughs into my face at short range, I am more likely to become infected by him than if I were breathing the more widely dispersed bacteria-laden atmosphere of a larger space. In addition, localised chilling of the skin caused by draughts is known to precipitate an attack of coryza, cystitis, or other local inflammatory reaction.

There are hazards associated with the isolated compartment, not scheduled in any sickness code, but a menace to society all the same. Rude and violent men have been known to interfere with lone passengers, and the communication cord is seldom within reach of a damsel in distress. Again, the railway companies themselves have recently been bewailing the wanton destruction of seat cushions, window straps, and so on. The remedy is in their own hands—to provide open coaches which can be properly supervised. The coaches of the American type offer comfortable, high-backed, adjustable seats which encourage passengers to avoid breathing into each others' faces, because they all face in the same direction. Although these coaches are usually kept too hot for my comfort, they are never foul; and the fault of overheating lies with American custom and not with the air-conditioning system. Each coach has a vestibule with double doors, so that the intruder does not carry with him a blast of cold air.

Admittedly there are some objections to the open coach—for example, that infant cries and other untoward noises may upset a whole carriage instead of ten victims in an isolated compartment. But this objection has to be balanced against a much greater freedom of movement. In any case there is little substance in the plea: I have travelled many hundreds of miles in such coaches and hardly remember a single instance in which there was any offence to eyes or ears. One might imagine dilatory arguments being put forward by the technical folk, to show that it would be difficult to introduce to the suburban lines rolling stock that was not readily interchangeable with the standard type, and that this would cause confusion during holiday rushes. But the public health is too important to be put off by technical issues.

Some of the railway companies in this country have been good enough to issue questionnaires to passengers, inquiring inter alia whether they preferred saloon carriages to separate compartments. I am credibly informed that some 60% were in favour of separate compartments, and it is possible that the companies may be making their plans in accordance with such estimates of public opinion. I hope they will first take note of the fallacies inherent in this method of discovery. It should be remembered that the vast majority of those questioned have no background of experience. They do not know what a well-designed coach is like, and they are therefore incapable of expressing a just opinion. Quite apart from this, however, it is surely reasonable that the railway authorities should attach a high value to the question of health and not allow themselves to be unduly influenced by a compound of whim and inertia.

Now that so many of us travel by train the matter is of great importance. It is all very well to post notices telling us that coughs and sneezes spread diseases, but we must face the practical issues involved. It is relatively easy, by such means as air-conditioning, assisted perhaps by aerosols or other anti-bacterial agents, to make a long carriage epidemiologically pretty safe, and certainly fresh and wholesome to the nostril; whereas nothing on earth is going to protect us from a man with a really bad cold, sitting with his nose four feet in front of us in a small compartment. Rail transport is a public service, and the true interests of the public ought to prevail.

* * *

It is not surprising that disappointed appellants for war disability pensions are dissatisfied and disgruntled: was there ever an unsuccessful litigant who agreed that he had received justice? No man is a competent advocate of his own cause. Wishful thinking inspires a perverted presentation of the facts; and what was originally a prejudiced impression develops with time into an established and honest belief.

Moreover, a layman is not in a position to see the technical details in their proper perspective. He is inclined to argue that any physical deterioration—let alone an unmistakable morbid condition—that has developed during his service is a direct consequence of military conditions which must therefore be regarded as directly responsible. When his claim to a pension or compensation is rejected, he is led to the resentful conclusion that the doctors, lawyers, and Government

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officials concerned in the matter of pensions are united in a conspiracy to deny him a square deal, to ignore his claims for consideration, and deprive him of his legitimate award. If we may believe the correspondence in the lay press, our profession is by no means unanimous on the criteria by which our opinions should be regulated, opinions which in most cases will influence the authorities who will make the ultimate decision.

In wounded men the position is plain. Compensation is unquestioned and can even be mathematically regulated according to the nature and extent of the disability. Likewise we need not hesitate to accept the responsibility of tropical service, the effects of diseases which would, of course, never have been encountered had the man remained at home. The hardships of captivity and of shipwreck, though not so accurately assessed, are justly comprehended within the same category. The trouble arises over the conditions which have a dubious relation to the circumstances of a military life, whether in the field or on home service. Time does not stand still because one is in khaki, Navy-blue, or Air Force blue. Uniform does not suspend or retard the processes of Nature; does it accelerate them? Speaking generally, is Service life more or less healthy than civilian life? It is all very well to talk about strain and worry as if these were encountered exclusively in the Services. To the majority the benefits are surely unexceptionable. On average the soldier's food is far superior to that of the civilian in war-time and indeed in peace. His hygiene is immeasurably better, his welfare is a source of perpetual solicitude, and his access to treatment unlimited. Only to the older men of fixed habits, who react badly to disciplinary restrictions, do regularity, open air, and exercise make no appeal, and they are prepared to blame what they dislike for any apparent ill-consequences.

Then there is the layman's attitude towards such conditions as leukæmia, cerebral tumour, malignant disease of the lung, Addison's disease, rupture of a congenital aneurysm—examples which have occurred in my own experience. We may say that such diseases are encountered in civil life and cannot be fastened on military service, but since we do not know their cause we are challenged to prove that a military life may not be responsible. Well, we can only answer that there is no scrap of evidence to point to a greater incidence of the particular disease in the Services. The lawyer likes, expects, or at least demands an unqualified answer to a categorical question. Would this disease have developed, or have progressed less rapidly, if the man had remained in civil life? Of course we can't give him the monosyllabic reply he wants, and instead attempt an explanation which though honest is often uncertain and generally unconvincing.

What do they say about V.D.? This is outside my beat, but though I am pretty sure of the judgment, I am prepared to accept a brief on behalf of a claim for compensation. Temptations resulting from the charm of uniform; periods of inactivity and boredom; lack of distractions and amusements; separation with deprivation of domestic amenities and their controlling influence—these are all direct consequences of military service. So why not a pension?

* * *

Your critic who reviewed the film *Conquest of a Germ* with such approval will like the new Noel Coward film *Brief Encounter*. This record of the furtive railway-station romance of a married doctor and a married woman is a noble story, sordid though it sounds in such bare outline. The doctor portrayed is an understanding and gentle lover who in one brief snatch over a cup of refreshment-room tea reveals his passionate interest in his work—preventive medicine, with special reference to the pneumoconioses. Yes, here is another film being shown to the general public which presents a doctor as a real man with human interests and passions, a moving tale told with great sympathy and care.

Another film, of quite a different kind, which should be seen when it comes round is *Painted Boats*, a dramatised presentation of the canals and the life of those who live on them. It breathes the love of Britain in a genuine and therefore attractive way; it would be nice to say that it was made by the British Council, but it wasn't.

Parliament

ON THE FLOOR OF THE HOUSE

MEDICUS M.P.

WITH Parliament in recess and the floor of the House innocent of legislation, changes are being prepared with even greater activity than before the adjournment. Progress is being made with the vast problems of the coal industry, with the setting up of working parties for export industries, with the establishment of new factories in the "development" (once the "depressed") areas, and with consultations on the National Health Service.

Soon after Parliament reassembles we shall know what the proposals of the Minister of Health are. It is to be hoped that at the same time as, or perhaps before, the actual tabling of the proposals on the order paper of the House of Commons, an announcement will be made on the conditions under which medical work has to be carried out during the preparatory period. If a date in 1948 is fixed as the time when the new service is to begin, then we shall have a period of about two years of carry-over during which medical work must go on.

What are to be the conditions in this medical interregnum? At present uncertainty is holding back a number of recently demobilised men and women who do not know where they stand. The Minister's announcement that there will be an end to the sale and purchase of panel and other public practices needs amplification by a statement of the methods by which this will be done. That there will be a planned scheme of compensation, including compensation for private as well as public practice, is known. That the compensation will be satisfactory to those concerned must be assured; but if the Government's general plans of compensation in other cases are taken as an example, there is no need to fear anything else. There will be different schemes for the man wishing to retire from practice and for the man intending to switch over from his present practice to the National Health Service. But in all cases a practitioner's capital investment and the value of his practice as it would be assessed by one of the two chief agencies will be the factors determining the amount of compensation to be paid. The younger man who left behind him a practice with a debt on it still unpaid when he entered the Armed Forces will receive compensation equally with the older man who stayed behind. Even if the practice of the younger man has faded away.

During the interregnum it may be that succession to a practice may be offered to a man or woman coming out of the Forces on the normal terms of purchase which have hitherto been the means of transfer of practices. In such a case it is to be presumed that the purchaser will carry over the right to compensation held by the present incumbent. But this is a matter on which a statement should be made; for until it is made there may be difficulty of transfer of practices—even in urgent cases due to illness or death.

We have been fortunate enough to escape major epidemics up to the present, but many older practitioners have had too strenuous a time during the war and it is essential that many more of the younger returning doctors should take on the harness and be ready to take over when the National Health Service begins. The building of health centres—both the physical erection of the necessary premises and the building of the teams which will do the work—is a task demanding careful preparation. This interregnum in which we are living provides time for it.

On the hospital side the situation can be seen more clearly, although present arrangements are very mixed. Evidently there is to be in the future one great integrated national hospital service which will be the spinal column of the National Health Service. The medical schools, the teaching hospitals, are to have that freedom which

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the proper discharge of the functions of a university demands.

The more the plans of the National Health Service emerge from the realm of generalities into the hard light of realisable, and realised, projects, the more impressive do they become. Our country has vast medical assets, in hospital buildings of all kinds, in hospital and general medical equipment, in university teaching hospitals. What can be done by the use of these assets when they are all coördinated has been shown by the E.M.S. in its very great work for the Services during the war. But that was only a beginning. A national hospital service as the backbone of the National Health Service will go far beyond what the E.M.S. did in time of war. For those returning doctors whose bias takes them towards hospital or institutional work, there need be no hesitation in deciding whether to enter now or stand back until the scheme is more fully defined.

Interesting queries are raised about matters which take us farther afield and outside the radius of the National Health Service as it will be presented to the House of Commons for legislative action. What is to be the relation between this service and that of the Armed Forces which, in fulfilment of our obligations to the United Nations, we and other countries will be obliged to maintain? Many members of Parliament hope that the medical services of Navy, Army, and Air Force may become part of the National Health Service. Another matter is that of our relations with the Colonies. It is highly unlikely that the National Health Service will include the Colonial Medical Service as part of itself. But it is most desirable that the closest contact should be maintained between the medical service of Great Britain and the Colonial Medical Service. When once the National Health Service is safely launched it is to be hoped that these two great services can be made one.

These wider questions are reviewed here because it is in this wider sphere that all social, political, and economic questions will more and more be considered in the future. The National Health Service and the Colonial Medical Service will be part of the great world International Health and Medical Organisation to which all countries of the world will contribute. And it is to that perspective of world medical and health organisation that the medical and health work in this country and in our Colonies must be related.

On Active Service

CASUALTY

KILLED

Captain BERNARD SIDMAN, M.B. Leeds, R.A.M.C.

AWARDS

MENTIONED IN DESPATCHES

R.N.V.R.

Surgeon Commander W. McO. MACGREGOR

Surgeon Lieutenants.—T. E. BAXWELL, A. F. ROSS

R.A.F.V.R.

Group Captains.—V. S. EWING, F. W. P. DIXON, M.B.E., H. C. S. PIMBLETT

Wing Commanders.—H. E. BELLRINGER, R. E. W. FISHER, H. F. HARVEY, L. P. McCULLAGH, J. C. TAYLOR, K. G. BERGIN, T. A. W. EDWARDS, E. B. HARVEY, R. C. JACKSON, F. V. MACLAINE, J. B. METHVEN, A. MUIR, J. V. QUINN, H. P. R. SMITH, A.F.C., E. O. WALKER

Squadron Leaders.—B. A. J. ARTHURE, J.C.McC. BROWNE, F. R. BUCKLER, T. G. DAVIES, E. O. EVANS,

Squadron Leaders—continued

B. J. FRANKENBERG, M. O. J. GIBSON, M. McLELLAN, R. MacPHERSON, C. W. R. RAYNE-DAVIS, E. P. S. SNELL, J. WATSON, P. A. CARRIE, W. P. GREENING, H. HALSON, A. HARGREAVES, G. C. HARTILL, G. O. HORNE, I. MacL. MacKAY, I. C. B. PEARCE, E. E. PHILLIPP, D.C. RUSSELL, J. H. SPENCE, T. F. STEWART

Flight Lieutenants.—N. N. BLAXLAND, E. S. BRAWN, H. D. FREETH, S. GRUBER, M. J. HOWLETT, G. E. McFALL, R. M. S. MATTHEWS, C. E. NICHOLSON

Public Health

Middlesex Considers Tuberculosis

THE reputation of Middlesex for care of the tuberculous possibly stands higher than that of any other county; so the report of a committee appointed to review the Middlesex tuberculosis scheme has special value as a standard. If Middlesex recognises large gaps in its service other counties may reasonably be suspected of even larger ones.

CHEST CLINICS

The committee rightly holds that the success of any tuberculosis scheme turns on the efficiency of the chest clinics. As a long-term policy these should be sited within the curtilage of a general hospital. They should be comfortable and attractive, and developed to the highest possible degree, with appropriate equipment and staff; for sanatoriums can have little influence in reducing tuberculosis unless there are proper arrangements for early diagnosis, preventive work, and out-patient care.

Middlesex is divided into eight administrative areas each served by one clinic. Three of these are housed in old semi-detached buildings with no X-ray plants; only one is at a general hospital, and this is cramped for space; three others are equipped with X-ray plants and housed in separate buildings, two of which were originally built as clinics; the eighth, also equipped with X-rays, is in cramped quarters in the local county offices. In only one clinic, the committee says, was the accommodation really adequate. X-ray plants have been ordered for two of the clinics lacking them; and new premises, where it will be possible to install plant, have been found for the third. It is suggested that a ninth chest-clinic area might be established at Harrow, and might form part of Charing Cross Hospital if this is rebuilt at Northwick Park. A tenth clinic at Ashford County Hospital is contemplated.

Better accommodation for existing clinics is largely a matter of long-term policy; but staffing and equipment can be considered at once. The committee proposes that tuberculosis officers should be given salaries more in keeping with their consultant status, the new scale to begin at £1000 and rise by annual increments of £50 to £1250 yearly, with power of extension to £1500 for men of outstanding ability, and that each should ultimately work with an assistant tuberculosis officer. Each clinic should have a whole-time radiographer, a dark-room assistant, and a complete X-ray apparatus, and some might also have a screening set. Much of the work of the clinic is carried on by the nurses—three or more at each—who act as combined clinic sisters and home visitors. The clerical work is complex and growing, and could possibly be simplified by a better method of record-keeping. The committee also considers that an occupational therapist should be appointed to arrange occupational work among patients who must remain at home for long periods. Members of chest clinics and mass-radiography staff should have annual medical examinations, with radiography of the chest.

SANATORIA AND HOSPITALS

Middlesex maintains three institutions for pulmonary tuberculosis, and reserves wards for such cases in five county general hospitals, providing accommodation at the end of 1943 for 1294 cases; in addition, Grims Dyke, Harrow, takes 50 men patients for rehabilitation. The county council also maintains some 300–400 patients elsewhere. The report notes that, while the tuberculosis beds in Middlesex institutions have increased by nearly 500 in the last three years, those available in outside institutions have fallen by nearly 200.

The thoracic surgical unit, established during the war at Harefield Sanatorium, is to be kept there for the present, but in due course a special building may be put up for it; and other units of the same kind may be developed as they are needed. It is assumed that the 22 hutted wards built by the E.M.S. at Harefield will be taken over eventually by the county. Two wards will be kept for non-pulmonary cases, and the remainder will be used for early cases with good prospects of recovery, some being adapted for recreation, occupational therapy, and classrooms.

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A unit of 50 beds will be allotted to each clinic area at the nearest county hospital. This unit will be used to assess difficult cases and to provide beds where those with advanced disease can be easily visited by relatives. "Bad chronic" cases will have beds in country houses. For "good chronics"—those who may be able to undertake a job, possibly their former work—an experimental hostel, it is suggested, might be set up where some 20 patients could live for a time, going out to work in the daytime and keeping touch with home and friends. They would thus be spared an abrupt return to ordinary life.

Research, the committee feels, must be encouraged, and members of the medical staff who wish to undertake original work should be supported. From time to time a research-worker with suitable qualifications might be engaged to study some special problem.

The committee agrees that certain of the council's tuberculosis officers should participate in the teaching of medical students.

Lower Mortality

The Registrar-General's return for the quarter ended Sept. 30, 1945, records a birth-rate of 15·6 per 1000 compared with 17·2 in the same period of 1944. In the previous five years the average rate for the September quarter was 15·1. Of the 167,962 children born, 86,713 were boys and 81,249 girls, a proportion of 1067 to 1000. The average for the ten preceding third quarters was 1058.

Infant mortality was 38 per 1000 related live births—the lowest recorded for any quarter, and 5 points below the average of the ten previous corresponding periods. In the four quarters immediately preceding, the rates were 40, 44, 59, and 41.

A general death-rate of 9·0 per 1000 compared favourably with 10·1 for the third quarter of 1944, and provided a new record. The average rate for the same period in the previous five years was 9·7. Births registered exceeded deaths by 70,863, the corresponding increases in the third quarters of 1942, 1943, and 1944 being 71,000, 70,832, and 76,340 respectively.

A total of 118,723 marriages was 36,421 higher than in the same period of 1944 and 5215 above the average for the same quarter in the previous five years.

Infectious Disease in England and Wales

WEEK ENDED JAN. 5

Notifications.—Infectious disease: smallpox, 0; scarlet fever, 1250; whooping-cough, 1048; diphtheria, 469; paratyphoid, 2; typhoid, 3; measles (excluding rubella), 771; pneumonia (primary or influenzal), 1165; cerebrospinal fever, 53; poliomyelitis, 13; polioencephalitis, 0; encephalitis lethargica, 1; dysentery, 285; ophthalmia neonatorum, 62. No case of cholera or typhus was notified during the week.

The number of service and civilian sick in the Infectious Hospitals of the London County Council on Jan. 2 was 1081. During the previous week the following cases were admitted: scarlet fever, 64; diphtheria, 43; measles, 11; whooping-cough, 23.

Deaths.—In 126 great towns there were no deaths from enteric fever, 6 (0) from measles, 1 (0) from scarlet fever, 14 (2) from whooping-cough, 12 (1) from diphtheria, 66 (7) from diarrhœa and enteritis under two years, and 123 (15) from influenza. Figures in parentheses are those for London.

Liverpool reported 12 deaths from diarrhœa and enteritis, and 8 deaths from influenza.

The number of stillbirths notified during the week was 217 (corresponding to a rate of 28 per thousand total births), including 20 in London.

THE U.S. Civilian Production Administration on Dec. 26 announced that in an effort to increase the production of penicillin it will give special priorities to producers and to builders of new penicillin plants. A statement from Washington says that most of the world-wide demand for penicillin at present centres on the 14 American plants, inasmuch as Canada, Australia, and the United Kingdom produce only about enough to supply themselves. Production in the U.S.A. has risen from approximately 400 million Oxford units in May, 1943, to an estimated 700,000 million units for 1945.

Letters to the Editor

INFECTION IN DAY NURSERIES

SIR,—The able paper by Dr. Allen-Williams in your issue of Dec. 22 will be welcomed as a serious scientific effort to obtain evidence on the much-discussed but little-investigated problem of the risk of infections in day nurseries. But those with practical experience of nursery work and administration will feel that certain points call for comment.

One of these is considered by Dr. Allen-Williams in her "discussion"—the potential inaccuracy in the ascertainment of the incidence of the various infections. Most medical officers of health will agree that she dismisses the matter too lightly. It may be taken as certain that even the mildest cases of all the infections mentioned will be discovered in those children who are in attendance at a nursery, and the nursery staff will tend to play for safety by treating minor skin conditions as "infections." On the other hand, it is doubtful if more than half the cases of measles occurring in children at home are actually notified and highly probable that some are forgotten and some completely missed. Of the other infections in the list, the mild cases of rubella, chickenpox, and impetigo will often be misdiagnosed by the mother as "food rash," "heat-spots," and "cold sores." The results would carry considerably more weight if the experiment were spread over a larger field in which the incidence of those infections whose ascertainment is more accurate was great enough to provide sufficiently large numbers for statistical validity.

A more important criticism, however, is that the investigation is too much of an academic exercise and has too little practical bearing on matters of present importance. At the moment there is a vigorous and acute controversy as to whether nurseries should or should not continue in their present form. What we need to know is not whether the risk of infection with one of a miscellaneous series of conditions ranging from the dangerous to the trivial is greater in the nursery than outside it but whether that risk constitutes a serious objection to the continuance of nurseries. From that point of view it is disappointing that a paper emanating from an institute of social medicine should deal with this subject in such an austerely scientific manner; it may be difficult to "balance the disadvantages attaching to a high infection-rate against certain recognised individual advantages to mother and child," but to attempt to do so would fall properly within the sphere of social medicine.

If we look at the subject from this angle, we can fairly say that at least four of the infections mentioned—rubella, chickenpox, impetigo, and mumps—are usually too trivial to be weighed in this balance. To these four we might possibly add uncomplicated measles and scabies as reasonable prices to pay for the excellent diet, the open-air life, and the social training which the good nursery gives and for the improvement in the family's economic circumstances which results from the mother's employment. It is further pertinent to mention that the very fact of nursery supervision is important in certain infections; in measles, for example, it ensures that prompt and proper attention is paid to the child's illness, whereas far too often the non-nursery child's measles is not taken seriously until complications make the parent realise that something serious is amiss.

If attendance at a day nursery increases the risk of infection, it is to be expected, as Dr. Allen-Williams finds, that infections will tend to occur at an earlier age. The significance of this finding is, however, obscured by the throwing together of all the infections listed and by the fact that all the children under the age of two are considered as a single group. For a child to contract measles or whooping-cough a couple of years earlier than might otherwise be the case can be a very serious matter, but a shift of the occurrence of impetigo or chickenpox from the fifth year to the third is usually of little moment. Again, if whooping-cough moves from the second age-group to the first, the effect will be more important if it is a move from the age of $3\frac{1}{2}$ to that of 1 year or under than if it is a move from $2\frac{1}{4}$ to $1\frac{3}{4}$.

None of the above criticisms should obscure the fact that this paper is of the utmost value in that it puts

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forward a sound technique for the serious investigation of a problem in which we have tended to rely too much on general impressions often coloured by preconceived ideas. I believe that I speak for most of my colleagues in the public-health service when I say that we shall welcome opportunities to coöperate with Dr. Allen-Williams in that extension of her investigations which I have suggested. We know, however, from experience in other fields, that scientific data may easily be misused by the ignorant or the prejudiced for political or quasipolitical ends, and it would indeed be unfortunate if this preliminary study became the weapon of those who oppose the continuance or extension of nursery provision.

JOHN D. KERSHAW,
Medical Officer of Health.
Accrington.

PROSTATECTOMY

SIR,—The introduction of the new surgical technique can make no difference to the immediate results of prostatectomy. Hey stresses the value of asepsis. Every thoughtful surgeon will agree with him. Equally important is antisepsis. The use of electrolytic sodium hypochlorite, the sulpha drugs, and urea formic iodide has made prostatectomy as safe as any major operation can be.

I have thoroughly enjoyed reading your leading article of Dec. 1, but I cannot imagine any urologist of experience agreeing with your statement about the suprapubic operation as it is practised today. I have performed retropubic prostatectomy. Your optimism about it is dangerous.

CLIFFORD MORSON.
Hampstead General and N.W. London Hospital, N.W.3.

SIR,—May I congratulate Mr. Millin on bringing retropubic prostatectomy to our notice. In my limited experience of the operation the points that have impressed me are the almost complete hæmostasis obtained and the shortened convalescence; but as a second-stage procedure the disadvantages of the retropubic operation seem to me to outweigh the advantages.

With regard to statistics there is a fallacy in Mr. Millin's letter in your issue of Jan. 5 which ought not to go unchallenged. It may well be that in a large series of men of 70 years one in every hundred can be expected to die each month. These deaths, however, will include instances of the manifold diseases to which the flesh is heir, and these cases will automatically be excluded from an average series of prostatics of 70, with the exception of unpredictable cardiovascular catastrophes. These would not number anything like one per hundred per month. Mr. Millin's inference, therefore, that during a period of seven weeks' convalescence 1·75% of a large series of prostatics would be expected to die regardless of operation or hospitalisation is clearly illogical.

HENRY K. VERNON.
St. James' Hospital (L.C.C.), London, S.W.12.

"REASONABLE DOUBT"

SIR,—The ætiology of leukæmia is obscure. We know a few agents, such as benzol, which may produce it; but we are certainly not in a position to state what factors do not, and cannot, cause it.

I am impelled to emphasise these facts, because the popular press has recently stated that a pension has been refused to the widow of an Army officer who died of chronic lymphatic leukæmia. The Under-Secretary for War said that the claim had been rejected on the advice of an independent expert appointed by the Royal College of Physicians; but he did not explain to their lordships that no man can be an expert on the unknown.

In the absence of certain knowledge of the cause of leukæmia, one must surely concede that each case must be considered on its merits. Thus, one may have doubts about a relationship between trauma and the development of leukæmia; but he would be a bold man who denied the possibility.

I know nothing about the case to which the newspapers refer; but I am aware that the Royal Warrant lays down that, where a reasonable doubt exists, such doubt shall be resolved in favour of the applicant. And I am confirmed in my long-held opinion that an applicant for a pension or for compensation is more likely to get a run for his money if the arbiter be a judge than if he be an official or even an expert speaking ex cathedra.

A. PINEY.
London, W.1.

HEPATITIS AFTER PENICILLIN INJECTIONS

SIR,—That the hepatitis reported by Howells and Kerr (*Lancet*, Jan. 12) was probably due to faulty technique of injections is suggested by the following evidence.

Early in 1945 it was noticed, in the medical wards of a British general hospital in Italy, that some patients with infective hepatitis, or at least with a condition clinically indistinguishable from this infection, gave a history of having been treated with penicillin for gonorrhœa a few months previously. Moreover we had the impression that these patients tended to have greater hepatic enlargement and were more seriously ill than the other cases of infective hepatitis which had not been so treated and were being admitted at the same time from the same area. Interest was also stimulated by the observation of an N.C.O. who said that of course he realised he would get jaundice after this new treatment for venereal disease. Further inquiry revealed that the patient next him in the queue for the three-hourly injections had remarked to him one day that he supposed he knew that he would probably be admitted for jaundice later on, because many men on this course developed it.

To avoid raising an unnecessary scare we decided that we would say nothing about this for a time but that three of us would make a point of asking every patient with jaundice whether he had had penicillin previously. Shortly after this one medical officer found that no less than 8 out of 9 men in his ward with infective hepatitis gave a history of a course of penicillin by injection within the past four months. Accordingly it was decided to warn all the medical officers. Unfortunately this period coincided with the normal decline in admissions for infective hepatitis during midsummer. However, during the next three months 16 out of 59 patients, admitted with an illness clinically indistinguishable from infective hepatitis, were found to have been treated with penicillin within the previous 2–4 months; 12 cases were collected during the period when suspicions were first aroused, which makes a total of 28 cases between January and June in the medical side of one hospital, and this at a time of year when the incidence of infective hepatitis was low. For the first three months of this period the inquiry was tentative; hence these figures are minimal, and the real incidence was in all probability higher.

At least 11 of the group had been treated for their venereal disease in the same clinic, most of them for gonorrhœa, but a few for syphilis. Inquiry at this clinic revealed that for the first three months of the year, owing to shortage of equipment, it had not been the practice to sterilise the syringe before each injection, though a fresh needle was used. Since then, however, with better supplies, a sterile syringe and a sterile needle were used each time. It might therefore be expected that the number of jaundice cases following the treatment would fall. Actually this has happened, but the statistics available are not such as to entitle one to say that this fall is definitely related to the change in technique.

Confirmation of these suspicions is suggested by information obtained from the orthopædic department of another hospital. One of the staff remarked that he wondered if the jaundice which was such a nuisance in their wards could have the same origin. Inquiry showed that there had been very few cases of jaundice in the general surgical wards of that hospital. Most of the orthopædic patients in this department had compound fracture of the femur and in consequence had to be kept at least three months before they could be evacuated. The general surgical cases were not kept so long but were usually in long enough to cover the ordinary incubation period of infective hepatitis (if this is taken to be about thirty days). Most of the cases of fractured femur received one or more courses of penicillin. Pressure of work in the department was at one time so high that as many as 60 patients were having an injection of penicillin every three hours. It will readily be appreciated what this means as regards equipment and organisation to ensure sterility. At this time they had no central sterilising-room, and it was impossible to boil the syringes and needles between each injection on the wards. Unfortunately this unit did not always record on the hospital cards the fact that a patient developed jaundice, nor was such an observation usually made on the follow-

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up cards after the patient had been evacuated. This was due to the fact that the possible relationship had not been realised, and they were only interested in orthopædic complications. However, evidence was obtained of 10 patients who developed jaundice before evacuation and after one or more courses of penicillin. The surgeons and nurses were certain that they had in fact had considerably more than 10 cases.

On the clinical side, as stated above, we formed the impression that these cases were definitely more severe than the ordinary cases of infective hepatitis being admitted at the same time. However, there were no deaths or any serious complications, and there is no reason to suppose that they were any worse than the severe cases often seen during the past three years. Sixteen consecutive cases were analysed as follows:

Severe	10	Moderate	2
Moderately severe ..	3	Mild	1

The incubation period varied but was always much longer than is usually seen in cases of infective hepatitis in which an estimate can be made. It was not always possible to be sure of the date of probable infection, because the course for syphilis may last 7–10 days; some patients have more than one course in a short time, and infection may be transmitted during the taking of blood for a blood-test. However, in most instances it was estimated to be 2–4 months and occasionally a little longer; in one instance it was 156 days.

The conclusion from these observations must be that infective hepatitis is being transmitted by faulty technique in administering penicillin parenterally. It is reasonable to assume that this state of affairs is similar to that previously described by other workers following injections of arsenic for syphilis and is a variety of homologous-serum jaundice. It is clear that the danger is not yet sufficiently appreciated, and it seems advisable that further warning should be given to all clinics and institutions where many blood-tests are made and injections given. The setting up of a central supply-room for sterilised equipment would do much to cover this problem, even as it has already proved so beneficial in many minor surgical procedures outside the operating-theatre.

St. Thomas's Hospital. RICHARD TURNER.

SALARIES OF LECTURERS IN MORBID ANATOMY

SIR,—A number of teaching appointments in university medical schools have recently been advertised. The highest salary that I have seen advertised for a lecturer in morbid anatomy is £600 p.a., while the salaries of equivalent appointments in bacteriology, clinical pathology, medicine, and orthopædics are £800, £900, £900, and £1250 respectively and prospects of private practice are offered to the last-named. A relatively large number of morbid anatomists volunteered for the Services in the war and have been required to do bacteriology, biochemistry, and clinical pathology. The work is considered by the Army authorities as relatively simple compared with morbid histology, which only specialists in that line are required to do. In addition, the morbid anatomist has often been given no opportunity to do his own work—indeed, when the War Office wanted medical museum specimens they flew a civilian to Italy and Holland, despite that fact that many of us were unemployed at the time.

The majority of morbid anatomists in the Services are now coming home—Glasgow University has seven returning—and almost all will have to look for appointments elsewhere. Surely they deserve equal treatment with bacteriologists and clinical pathologists, and better treatment than those who took their civil appointments temporarily and used the opportunity to study for other specialties—e.g., gynæcology and medicine. My earnings in the first three years as a civil morbid anatomist totalled £775. I find that the temporary holders of my appointment started at £650 p.a. I have higher degrees and numerous publications to my name, of which my successors have had none. Shorn of war-time increments I would return to a salary of £475 p.a. Should I not be offered my temporary successor's £650, plus an increment for experience and qualifications, and should not my temporary successor enter the R.A.M.C. now to facilitate the class B release of some of my colleagues?

MORBID ANATOMIST, R.A.M.C.

PENICILLIN IN PARATYPHOID FEVER

SIR,—Enteric organisms are usually considered insensitive to penicillin, but *Bacterium typhosum* obtained by Jordan and Eversley [1] in an outbreak in Normandy was found to be sensitive to large concentrations in vitro. Consequently, when six cases of paratyphoid B, infected by the same carrier and diagnosed by blood-culture, were recently admitted to this hospital, we decided to try the therapeutic effect of large doses of penicillin, although the organisms have subsequently been shown not to be sensitive in vitro to lower concentrations than 400 units per c.cm. The cases were divided into three pairs, graded according to severity, and the iller of each pair was treated with penicillin, 100,000 units intramuscularly three-hourly for three days and subsequently 50,000 units until clinically satisfactory. Treatment was begun on the ninth day of illness in each case. Results are summarised here:

Case	Total dosage of penicillin (units)	Fever: Initial	Fever: Maximum	Fever: Day when maximum	Fever: Duration, days	Toxicity: Initial	Toxicity: Maximum	Toxicity: Day when Maximum	Toxicity: Duration, days
1	4,700,000	103·8°	104·4°	12	24	++++	++++	Init.	21
2	Control	103·6°	104·4°	11	31	++ .	+++	11	27
3	3,850,000	102·8°	103·6°	12	19	++	++	Init.	17
4	Control	103·6°	103·6°	7	16	++	++	—	12
5	3,000,000	100·8°	101°	11	12	++	++	—	12
6	Control	102·4°	103·8°	14	24	+	+	—	18

Init. = Day on which treatment begun. Other figures indicate day of disease.

Averages.—Duration of pyrexia in penicillin-treated .. 18·3 days.
Duration of pyrexia in controls .. .. 23·6 days.
Duration of toxicity in penicillin-treated .. 16·6 days.
Duration of toxicity in controls .. .. 19·0 days.

When penicillin was begun case 1 was extremely ill, being weak, comatose, and incontinent. At this stage he was very much more ill than his control, but within a few days he had improved dramatically. However, on the 10th and 15th day of illness both he and the control were given a blood-transfusion, each receiving ½ pint from the same donor. Unfortunately, though case 1's transfusions were uneventful, case 2 reacted badly and on each occasion the transfusion had to be stopped. Again, case 5 had received his T.A.B. some 5 months previously, as compared with 14 months in his control. These examples illustrate the number of variables which may invalidate figures based on a small series, but we are recording our findings in the hope of stimulating other workers to a more extended trial when occasion offers.

We wish to thank Colonel V. C. Verbi for permission to publish these cases and Brigadier R. E. Tunbridge, consultant physician, B.A.O.R., for his interest.

J. W. CROFTON.
B.A.O.R. A. M. TURNER.

NEW REMEDY FOR LUPUS

SIR,—Your annotation of Jan. 5 contains a statement which does not accord with known facts; its implications will almost certainly give rise to misunderstanding and confusion in the practical application of this remedy, and for that reason should be corrected. I refer particularly to the sentence: "Unlike the natural vitamin D_3, obtained from fish-liver oils, calciferol is prepared artificially by irradiating a vegetable sterol, ergosterol, and preparations may include other toxic by-products of irradiation."

In the first place, it is now recognised that any distinction such as that implied by the term "the natural vitamin D_3" is unwarranted; both vitamin D_2 and vitamin D_3 occur naturally, in fish-liver oil, and both are prepared synthetically, one by irradiation of ergosterol and the other by irradiation of 7-dehydrocholesterol. That there is no scientific basis for the suggestion that the vitamin D in fish-liver oil is free from associated products of irradiation is a fact, but of minor importance.

1. *Lancet*, 1945, ii, 333.

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The really serious source of misunderstanding is the clear suggestion that synthetic calciferol preparations are relatively more toxic than preparations of vitamin D from natural sources. In this country it is common practice in the manufacture of vitamin-D preparations to employ pure crystalline calciferol from which all toxic products of irradiation have been removed. In the present state of knowledge, no other material could provide a greater vitamin-D activity with less toxicity. This does not apply to the United States, where crude irradiated ergosterol is still in common use.

The treatment described can be carried out conveniently only with a preparation of high potency. Any such preparation generally available in this country—including, we believe, the preparation used in the work under discussion—would almost certainly represent pure calciferol. It would at least be quite simple to check this fact by reference to the makers. On the other hand, we know of no preparation obtained from natural sources having a potency sufficiently high to suit the purpose.

Greenford, Middlesex. J. T. MARSH.

LONDON AS POSTGRADUATE CENTRE

SIR,—We have read with interest the admirable letter last week from Prof. W. C. W. Nixon on the needs of the medical postgraduate; with the general spirit of his observations we desire to associate ourselves. There is one point, however, on which we feel that a word must be said. Dr. Nixon quotes Professor Grey Turner as having pleaded for the establishment of a Central Bureau of Medical Information and goes on to welcome the proposed establishment of a world centre for postgraduate training in London.

To those of us who have given a considerable proportion of our time and energy to the activities of the Fellowship of Medicine, a body established in 1919 by the energy and initiative of Sir Arbuthnot Lane, Sir StClair Thomson, and Sir John Macalister, and constituting just such a Central Bureau of Information as is desired, Professor Grey Turner's plea was really heart-breaking. By the end of 1943 a total of over 11,000 postgraduates had taken advantage of the facilities obtained through the offices of the fellowship, and the total number of tickets issued for postgraduate courses *arranged by the fellowship* was over 16,000. During the whole of the most difficult period of the war, when absence of our regular teachers and the obstacles imposed by bombing and blackout made work and organisation well-nigh impossible, the Fellowship of Medicine kept its head above water and still continued to provide information and assistance for those (and there were not a few) who sought its help. Our best and unsolicited testimonials have come from members of the profession in the Dominions, who have been among our best friends and who have looked and still look to us as liaison officers between them and the hospitals of the mother country.

In view of the 27 years of experience which this bureau has had, is it too much to expect that in the planning of future postgraduate work it should at least receive some recognition of its existence by the political planners of today?

MAURICE DAVIDSON,
Hon. Secretary and Chairman of Executive Committee.
CHARLES D. READ,
Hon. Treasurer.

Fellowship of Postgraduate Medicine, 1, Wimpole Street, London, W.1.

GRAM-POSITIVE

SIR,—Your annotation of Jan. 12 refers to recent important work by H. H. Stacey and others on the gram-positive constituent in bacteria. Unfortunately, owing to illness, I have not had opportunity to acquaint myself with the details of their investigation. But may I, in justice to the past, venture to recall the fact that, so long ago as 1911 my lamented colleagues G. Dreyer and S. G. Scott and I published the fact that the gram-positive substance, whatever it may be, could be washed out of bacteria (e.g., by ether), rendering them gram-negative, and could, from the extract so obtained, be washed into naturally gram-negative organisms, rendering them gram-positive.[1]

It is a great pleasure to learn that new light is now being thrown on these old observations.

Upavon, Wilts. E. W. AINLEY-WALKER.

1. *J. Path. Bact.* 1911, **16**, 116.

Medical Diary

Jan. 20 to 26

Tuesday

UNIVERSITY OF LONDON
5.15 P.M. (University College, Gower Street, W.C.1) Mr. F. Bergel, PH.D.: Prosthetic Compounds. (Second of five lectures.)

ROYAL SOCIETY OF MEDICINE, 1, Wimpole Street, W.1.
4.15 P.M. *Pathology* (Lister Institute, Chelsea Bridge Road, S.W.1). Demonstration.

MEDICAL SOCIETY OF LONDON, 11, Chandos Street, W.1.
5.30 P.M. Mr. R. M. Handfield-Jones: Infections of the Hand. (Lectures for demobilised medical officers.)

UNIVERSITY OF EDINBURGH
5 P.M. (Pollock Memorial Hall, Bristo Street, Edinburgh) Dr. Douglas Guthrie: The Search for a Philosophy of Medicine. (Introductory lecture.)

Wednesday

ROYAL FACULTY OF PHYSICIANS AND SURGEONS OF GLASGOW, 242, St. Vincent Street.
4 P.M. Prof. Harry Platt: Localised Cystic Lesions. (James Watson lecture.)

Thursday

ROYAL COLLEGE OF SURGEONS OF ENGLAND, Lincoln's Inn Fields, W.C.2.
5 P.M. Mr. C. H. Gray: Sciatica. (Hunterian lecture.)

SOCIETY OF THORACIC SURGEONS OF GREAT BRITAIN AND IRELAND.
3 P.M. (Royal College of Surgeons). Dr. Clarence Crafoord: Coarctation of the Aorta and its Surgical Treatment.

MEDICO-LEGAL SOCIETY
8.15 P.M. (26, Portland Place, W.1) Mr. V. Zachary Cope and Judge Earengey, K.C.: Medicolegal Aspects of Damages for Shock.

ASSOCIATION OF SCIENTIFIC PHOTOGRAPHY
6 P.M. (B.M.A. House, Tavistock Square, W.C.1) Dr. R. B. Billings: Medical Photographer or Photographing Medico.

Friday

ROYAL COLLEGE OF OBSTETRICIANS AND GYNÆCOLOGISTS, 58, Queen Ann Street, W.1.
5 P.M., Dr. Leonard Colebrook, F.R.S.: Looking Backwards and Forwards—Control of Infection in Obstetrics. (Blair-Bell lecture.)

ROYAL SOCIETY OF MEDICINE
3 P.M. *Epidemiology and State Medicine.* Dr. Charles Hill: Popular Health Education.
4.30 P.M. *Disease in Children.* Mr. and Mrs. A. W. G. Ewing: Disorders of Hearing in Relationship to General Health in Childhood.

MEDICAL SOCIETY OF LONDON
5.30 P.M. Dr. C. F. Harris: Gastro-enteritis of Children. (Lectures for demobilised medical officers.)

ASSOCIATION OF CLINICAL PATHOLOGISTS
10 A.M. (London Hospital, E.1) Dr. A. G. Shera: Intestinal Spirochætosis. Dr. C. E. Dukes: Bowel Operation Specimens of Carcinoma. Colonel H. E. Shortt: Leishmaniasis. Dr. F. W. Gunz: Transfusion Reactions due to Rh. factor. Dr. W. H. Cant and Dr. H. S. Baar: Auto-immunisation and Iso-immunisation.
5 P.M. Dr. D. Nabarro: Serological Reactions in Congenital Syphilis. Prof. J. McIntosh: Penicillin in Bacterial Endocarditis.

Saturday

MEDICAL SOCIETY FOR THE STUDY OF VENEREAL DISEASE
2.30 P.M. (11, Chandos Street, W.1) Major M. H. Salaman, R.A.M.C.: Non-specific Genital Infections.

ASSOCIATION OF CLINICAL PATHOLOGISTS
10 A.M. Dr. A. J. Rhodes: Diagnosis of Virus Diseases. Dr. J. L. D'Silva and Dr. E. C. Turton: Matching the Tints of Carboxyhæmoglobin Solutions. Mr. P. G. Shute, F.R.E.S.: Laboratory Diagnosis of Malaria. Mr. Kenneth Walker: Testicular Biopsy. Dr. Hadley Jackson: Examination of Seminal Fluid.
2.45 P.M. Discussion on Sedimentation Rate (Dr. K. Rogers and Mr. H. B. Salt).

Appointments

FOWLER, W., M.B. Glasg.: asst. M.O. in the V.D. department, Leeds General Infirmary.
HAYES, L. M., M.B., N.U.I.: examining factory surgeon for Garstang, Lancs.
JONES, A. NORMAN, M.B. Lpool, F.R.C.S.: temp. med. superintendent, Whipps Cross Hospital, London, E.11.
LYON, D. M., O.B.E., M.B. Edin.: temp. asst. M.O. for East Sussex.
WALKER, BETTY, M.B. Lond.: asst. M.O. in V.D. department, Leeds General Infirmary.

THE National Council of the Scottish Nationalist Party have asked Dr. W. O. G. TAYLOR to stand as their candidate in the Cathcart (Glasgow) by-election. Dr. Taylor, who graduated M.B. at the University of Glasgow in 1934, is surgeon in charge of diathermy at the Glasgow Eye Infirmary. During the war with the rank of major he served as an ophthalmological specialist in the East Africa command.

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Notes and News

SOUTH AFRICA'S WAR MEMORIAL

SOUTH AFRICAN troops stationed in North Africa have asked that the war memorial of their country shall be a living one, and after consultations between the government and the national war memorial interim committee it has been decided that the memorial shall take the form of a health foundation. The National War Memorial Health Foundation, as it is to be called, will establish a nutritional research institute to investigate nutritional standards particularly among non-Europeans. The foundation will also help in educating all sections of the population in sound food habits, and it will provide scholarships for research into the promotion of health and the prevention of disease, and bursaries to train personnel for the national health service. An appeal for the fund will soon be launched on a national basis.

SWEDEN HELPS IN EUROPEAN RELIEF

LAST summer Sweden voluntarily accepted 31,000 former slave workers and other war victims found to be in especially bad health on their release from Nazi prison camps. Offered a diet of 4800 calories, they improved rapidly, despite some initial digestive disturbances, and 11,000 adults had returned to their own countries by the end of September. Before repatriation, each person is given an outfit of warm clothing and food for ten days. Babies and children, some of whom appeared to be moribund when they reached Sweden last summer, have made impressive progress, and nearly all are restored to normal health.

Sweden is to extend her relief activities by establishing feeding, clothing and medical centres for children in all zones of Germany and Austria. This action has been organised by the Swedish Red Cross and the Save the Children Society with the support of the Swedish government. A number of feeding centres will be established in Hamburg and the Ruhr, and probably also in Berlin. From the middle of this month, 10,000 Viennese children between 3 and 6 years of age are to receive daily meals for a period of two months.

A REST HOME FOR STUDENTS

MANY university students in Europe have had hard and terrible experiences during the years of German domination: some have been in concentration camps, some have served in underground resistance movements, and some are so much weakened by hardship and lack of adequate food that their health has suffered. The International Student Service has set up a rest home at Combloux, near Mont Blanc, where such exhausted students can rest and recover their strength. The chalet houses 80 students at a time, and they stay 1–3 months; their life is planned by their own committee and they have many opportunities of devising schemes for self-help and for helping fellow students in financial or other difficulties. They get up at 9 A.M., rest from 2 to 4 P.M., and go to bed at 10. During the day they form study circles to examine problems now facing students in Europe—university reform, political issues, and trends of thought in art and literature. They also get up concerts and plays, develop hobbies such as photography, and run a poster news service.

The first annual conference of the I.S.S. since 1939 was held at Combloux last July; students from twelve different countries attended and discussed war and peace, and first experiences of university reconstruction. The I.S.S. hope that student groups everywhere will help to maintain the chalet; £12 will keep a student for a month. Those wishing to help may send contributions to the general secretary, International Student Service, 1, Sloane Square, London, W.1.

FILMS FROM PARIS ON MICROBIOLOGY

IN a short lecture arranged on Jan. 4 by the British Council, Dr. P. de Fonbrune of the Pasteur Institute, Paris, showed a film of the micro-dissection apparatus used there. The preparation of micro-needles and pipettes was illustrated in detail, with the pneumatic reduction-control employed, and the delicacy of manipulation possible was well brought out. This demonstration was followed by three short films in which the apparatus was used. The first showed the behaviour of a lancasterella parasite in frog's blood. The second showed the behaviour of amœbæ in the normal state, and with their nucleus abstracted, and finally the effect of transferring the nucleus from one amœba to another from which it had been removed. The third film revealed the habits of a predatory mould which traps nematodes in an explosive ring-grip formed by three hyphal cells. All four films are of teaching value, and we hope the British Council will be able to make them available soon.

PECKHAM

Dr. G. Scott Williamson, speaking at a meeting of the Town and Country Planning Association on Jan. 10, described the development of the Peckham Health Centre. He stressed the importance of the family as a unit. Experience had shown, he said, that in a mixed community 2000 families must be studied to provide examples of every human capability: but if the families belonged to a uniform wage-group, 10,000 must be taken as the minimum. Peckham was an attempt to study the growth of the individual: the development of each member's faculties without restriction had been encouraged; people wanted to develop their capabilities, but preferred to do so without guidance. Periodic physical examinations had been undertaken. When the centre was first opened, 10% had nothing wrong with them, 20% had something wrong and knew it, while the remainder had something wrong of which they had been unaware. Three or four years later, 30% had nothing wrong—an improvement attributed to the development of members' faculties.

Royal College of Surgeons of England

On Jan. 9, before he delivered the Moynihan lecture, Prof. Willem Noordenbos of Amsterdam was admitted to the honorary fellowship of the college, to which he had been elected in 1943 while in captivity under the Germans. On Jan. 10, Sir Henry Dale, O.M., and Sir William Collins were also admitted to the honorary fellowship. The First Lord of the Admiralty presented to Surgeon Lieut.-Commander F. P. Ellis, R.N., the Gilbert Blane medal awarded for his observations on the effect of the thermal environment on the health and efficiency of ships' companies working in the tropics.

At a meeting of the council on Jan. 10, with Sir Alfred Webb-Johnson, the president, in the chair, Prof. F. Wood Jones, F.R.S., was admitted as the first Sir William Collins professor of human and comparative anatomy. It was reported that Sir James Walton would deliver the Hunterian oration for 1947 and Sir Heneage Ogilvie the Bradshaw lecture for 1946.

It was decided to institute a club in the college for fellows, members, licentiates in dental surgery, and members of all the associations linked with the college through the joint secretariat at 45, Lincoln's Inn Fields. It was also decided to hold a meeting of fellows on Wednesday, May 8, at 6 P.M.

The following diplomas were granted jointly with the Royal College of Physicians:

D.P.M.—Arthur Conachy, A. J. F. Crossley, J. E. Duffield, P. E. Sundt, T. G. Williams.

D.L.O.—Frank Badrock, R. V. Blaubaum, Leo Boss, T. McM. Boyle, L. C. Jacobson, Hanus Jelinek, A. E. Khan, H. E. McHugh, W. J. O. Page, W. M. Ritchie.

University of Glasgow

On Jan 12 the following degrees were conferred:

M.D.—A. K. MacRae (with honours); Constance A. C. Ross (with commendation); William McAdam.

M.B., Ch.B.—John Rankin (with commendation); J. M. Adam, J. K. Anderson, James Austin, Elizabeth Boothe, James Buchanan, R. W. Campbell, G. A. Carnachan, D. B. Carruthers, Douglas Clark, D. S. Cranston, J. S. Creighton, Isabella G. M. Cunningham, J. M. Harper, R. R. Houston, Kilpatrick Jack, W. A. Jackson, Matthew Laidlaw, R. M. Lang, J. W. Little, J. A. McCusker, Neil McDougall, J. A. W. Maguire, D. H. Munro, J. D. Nelson, T. C. Nicol, J. H. Noble, J. M. O'Brien, R. H. Park, J. D. Paterson, John Prentice, I. P. F. Rae, J. H. R. Ramsay, William Ramsay, R. C. Robb, J. W. Roberts, William Roy, Betsy D. Scott, W. L. Selkirk, D. C. V. Stewart, Elizabeth Stewart, Thomas Thomson, W. F. Toomey, J. L. F. Wyllie.

The Bellahouston medal was presented to Dr. Thomas Anderson for his M.D. thesis entitled Clinical Studies in Chemotherapy.

University of Edinburgh

Dr. Douglas Guthrie, the newly appointed lecturer in the history of medicine, will deliver an introductory lecture in the Pollock Memorial Hall, Bristo Street, Edinburgh, on Tuesday, Jan. 22, at 5 P.M. He will speak on the Search for a Philosophy of Medicine.

On Friday, Feb. 22, at 5 P.M., at University New Buildings, Teviot Place, Sir Alexander Fleming, F.R.S., will deliver his Cameron prize lecture on Penicillin—its Origin and Use. Sir Howard Florey, F.R.S., delivered his Cameron lecture on Jan. 18 on the Development of Antibiotic Studies.

University of St. Andrews

At recent examinations the following were successful:

FINAL EXAMINATION FOR M.B., CH.B.

D. A. Kerfoot (with commendation); W. K. Bryson, J. H. Burt, Alexander Douglas, I. C. Geddes, Katherine M. Kelly, H. A. F. Mackay, Joan C. Main, W. B. Wallace, and Margaret A. M. Wilson.

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National University of Ireland

The Henry Hutchinson Stewart scholarship in mental and nervous diseases for 1945 has been awarded to Dr. D. J. O'Doherty (University College, Dublin).

An Empire Pharmacopœia

Mr. R. R. Bennett, addressing the Pharmaceutical Society on Jan. 10, said that Empire coöperation had been invited to ensure that the new *British Pharmacopœia*, now in preparation, should be suitable for the whole Commonwealth. Supplementary lists might be issued to meet local needs.

Fellowship in Genetics or Mental Health

Radcliffe College, Cambridge, Mass., invites applications for the Helen Putnam fellowship for advanced research in genetics or mental health. The fellowship, which carries a stipend of $2000, is tenable for 11 months, from Oct. 1, 1946, is open to women who have gained their doctorate or possess similar qualifications and who have research in progress. Applications for the award must be sent to Radcliffe College not later than April 1.

Proposed Chair of Psychiatry in Manchester

Plans for a coördinated psychiatric service are announced by the joint hospitals advisory board of Manchester, Salford, and Stretford. The scheme (described in the *Manchester Guardian* of Jan. 9) covers six municipal and voluntary hospitals, and includes the provision of home treatment and child-guidance clinics. It is estimated that 150 beds will be required for psychiatric cases in general hospitals. The board suggests that a chair in psychiatry should be set up by Manchester University, which would assume responsibility for teaching and become the academic centre of the service.

Rushcliffe Scale for Midwives and Mental Nurses

The Minister of Health has informed Lord Rushcliffe, chairman of the Nurses' Salaries Committee, the Mental Nurses Sub-Committee, and the Midwives Salaries Committee, that any increases recommended following the review of the salaries of mental nurses and midwives now taking place will have effect as from Jan. 1, 1946.

Chadwick Lectures

The following public lectures have been arranged for the next half-year: Dr. A. G. G. Thompson, Land Utilisation in Relation to the Public Health (Feb. 19, 2.30 P.M., at 26, Portland Place, London, W.1); Dr. S. A. Henry, Medical Service in Industry (March 5, 4.30 P.M., University of Sheffield, Western Bank, Sheffield, 10); Mr. D. Winston Aldred, F.R.I.B.A., the New Building Science (April 9, 2.30 P.M., 90, Buckingham Palace Road, S.W.1); Major Eyre Carter, the Rehabilitation of Stateless Persons and its Hygienic Bearings (May 7, 2.30 P.M., Caxton Hall, S.W.1); Miss Ellen Delf, D.SC., Plants in the Service of Mankind (June 20, 4 P.M., Chelsea Physic Garden, S.W.3). Further information may be had from the secretary of the trust, 204, Abbey House, Westminster, S.W.1.

Socialist Medical Association

During its health services week the association is holding 14 public meetings and an exhibition illustrating the battle for health. The first public meeting will be held at the Royal Opera House, Covent Garden, London, W.C.2, on Feb. 2, at 3 P.M., when the speaker will be Mr. James Griffiths, the Minister of National Insurance; and Mr. Aneurin Bevan, the Minister of Health, will wind up the series at Friends Meeting House, Euston Road, N.W.1, on Feb. 9, at 3 P.M. The exhibition and other meetings will be held at Livingstone Hall, 66, Broadway, S.W.1, and the medical speakers will include Mr. Somerville Hastings, M.P., Lieut.-Colonel Main, R.A.M.C., Mr. A. W. Bourne, Prof. J. R. Marrack, Prof. J. M. Mackintosh, Dr. Horace Joules, Dr. Stark Murray, Dr. J. Powell-Evans, and Dr. Joan McMichael. Further information may be had from the secretary of the association, 35, Long Acre, W.C.2.

Dried Bananas

The Minister of Food announces that it has been found necessary to terminate the arrangements made with the War Organisation of the British Red Cross Society and Order of St. John of Jerusalem for the supply of dried bananas free of cost to patients with steatorrhœa (including cœliac disease and tropical sprue). The Ministry has arranged that Messrs. Mapleton's Nut Food Co. Ltd. (Garston, Liverpool 19) shall supply dried bananas direct to these patients at the rate of 14 lb. per month and at the cost of 9½*d.* per lb. post free. Applications should be supported by a medical certificate, and 11*s.* 1*d.* should be enclosed. Further supplies may be had monthly without a fresh certificate.

Nurses' Gift to Unrra

The nursing staff of Lewisham Hospital has sent a cheque for £130 to UNRRA for medical relief work.

Return to Practice

The Central Medical War Committee announces that Dr. A. W. SPENCE has resumed civilian practice at 47, Queen Anne Street, London, W.1.

King Edward's Hospital Fund for London

The King has sent an annual subscription of £1000 to the fund.

Pharmaceutical Society of Great Britain

The Privy Council has nominated Dr. Bertram A. Young, medical superintendent of St. Alfege's Hospital, L.C.C., to the council of the society in place of Sir Walter Langdon-Brown who has resigned.

R.A.M.C. (T.A.) Reunions

The 140 County of London field ambulance have formed an old comrades' association for all pre-war and war-time members. They meet on the first Friday of every month at 7 P.M. at the central mess, Duke of York's Headquarters, Chelsea. All officers and other ranks of 140 field ambulance, 13/4 London general hospital, 141 field ambulance, the 8th field hygiene section, and any affiliated units will be welcome at these meetings.

Summer School in Health Education

The Central Council for Health Education will hold a residential summer school at Somerville College, Oxford, from Aug. 14 to 28. The directors of the school will be Miss D. E. M. Gardner, head of child development department, University of London Institute of Education, and Dr. Robert Sutherland, medical adviser and secretary to the council. The school is intended for those who have to do with the training and care of children and young people—including health visitors, school nurses, educational and medical administrators, and welfare superintendents. Further information may be had from Dr. Sutherland at the council's offices, Tavistock House, Tavistock Square, London, W.C.1.

Society for Relief of Widows and Orphans of Medical Men

At a meeting of the directors on Jan. 2, with Dr. R. A. Young, the president, in the chair, it was reported that £15 had been sent at Christmas to each of the 55 widows in receipt of grants. £1940 was voted for the payment of the half-yearly grants. Members who have been serving in H.M. Forces and have now returned to private practice, are asked to send their present address to the secretary at 11, Chandos Street, London, W.1. Relief is granted only to the widows and orphans of deceased members. Membership is open to any registered practitioner living within 20 miles of Charing Cross.

Births, Marriages, and Deaths

BIRTHS

DENNY-BROWN.—On Jan. 9, at Lewes, Sussex, the wife of Brigadier D. Denny-Brown, R.A.M.C.—a son.

TRAINER.—On Jan. 8, the wife of Dr. L. Trainer, L.D.S., of Kelso—a son.

MARRIAGES

ATTENBOROUGH—MANSBRIDGE.—On Dec. 26, at Peshawar, India, John Attenborough, captain R.A.M.C., to F. Mansbridge, sister, P.M.R.A.F.N.S.R.

BARLING—GARTHWAITE.—On Jan. 5, at Guildford, Gilbert Michael Barling, captain R.A.M.C., to Dorothea Garthwaite.

KAULA—KNOWLES.—On Dec. 27, at Trincomalee, Ceylon, Charles V. Kaula, surgeon lieutenant R.N.V.R., to Pamela Knowles.

LADKIN—BONHAM-SMITH.—On Dec. 29, at Kampala, Uganda, Ronald Greaves Ladkin, B.M., Colonial Medical Service, to Dorothy Heloise Bonham-Smith, Colonial Nursing Service.

ROOK—WILSON.—On Jan. 8, at Amersham, Alan Filmer Rook, C.B., O.B.E., F.R.C.P., air vice-marshal, to Elizabeth Wilson.

TAYLOR—WATSON.—On Jan. 9, at Buxton, John Wentworth Taylor, surgeon lieutenant R.N.V.R., to Evelyn Margaret Watson.

DEATHS

ATKINS.—On Jan. 10, at Glasgow, Thomas Richard Webster Atkins, O.B.E., L.R.C.P.E., senior surgeon, Merchant Navy.

GORE.—On Jan. 10, at Colchester, William Crampton Gore, M.B. Dubl.

JAMES.—On Jan. 5, at Aberystwyth, Walter Timothy James, M.D. Edin., of Newquay, Cards., aged 67.

MARRIAGE.—On Jan. 12, at Woldingham, Surrey, Herbert James Marriage, M.B. Lond., F.R.C.S., aged 73.

PEVERLEY.—On Jan. 9, at Farnham, Surrey, Walter Augustus Peverley, M.B. Durh., formerly of Durban, South Africa.

SUTHERLAND.—On Jan. 10, at Ealing, Donald George Sutherland, M.A. Camb., M.B., B.SC. Edin., aged 82.

WHITELOCK.—On Jan. 8, at Oxford, Hugh Anthony Bulstrode, M.CH. Oxfd, F.R.C.S., aged 54.

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TETANUS IN THE AFRICAN AND EUROPEAN THEATRES OF WAR

1939-1945

J. S. K. BOYD
O.B.E., M.B. Glasg., D.P.H. Camb., K.H.P.
BRIGADIER

THE object of this report is to assess the incidence of tetanus in the European and African campaigns of 1939–45; to ascertain as far as possible the extent to which this has been influenced by active and passive immunisation; to examine the effect of immunisation on the severity of the disease; to discuss the failure of active immunisation in preventing the development of tetanus in certain cases; and to consider the results of various forms of treatment and other matters of lesser importance.

SOURCE OF MATERIAL

The report is based on the records of 103 cases of tetanus in British, Indian, Dominion, and Colonial land forces, in a few Allied troops, and in prisoners-of-war during military operations in the European and African theatres of war. Most but not all of the patients were battle casualties. They were treated in military and E.M.S. hospitals. The figures include 18 cases already reported from Middle East Force (Boyd and MacLennan 1942) and are believed to be complete so far as United Kingdom, Australian, New Zealand, South African, Indian, and miscellaneous Colonial troops are concerned. They do not include Canadian figures. In most cases the details are taken from A.F. I.1234 (Special Report on a Case of Tetanus), in a few from the medical case-sheet (A.F. I.1237) or a note written by the medical officer. In some the data are incomplete, and in consequence the details in certain of the tables are not available from all 103 cases; this does not affect the tables of incidence, in which every known case is included.

IMMUNISATION AGAINST TETANUS

Passive immunisation against tetanus by inoculation with tetanus antitoxin was used for the first time on a large scale in the war of 1914–18, and its value as a prophylactic measure was fully tested and proved. Full details concerning this are to be found in the Official Medical History of the War of 1914–18 and need not be recapitulated. It is sufficient to recall that from an initial level of over 8 per 1000 wounded, which was the figure before prophylactic antitoxin was widely used, the incidence of tetanus ultimately fell to about 1 per 1000 when all at risk were treated in this way; the average incidence on the western front during the four years of war was 1·47 per 1000 wounded.

In the interval between the two world wars, Ramon and his collaborators (Ramon and Zoeller 1927) showed that *active immunity* to tetanus could be produced by inoculation with formolised tetanus toxoid. This discovery was confirmed in the vaccine department of the Royal Army Medical College, where experiments were made to determine the optimal dosage and spacing of doses (Boyd 1938). It was found that two doses of 1 c.cm. of a potent toxoid, given at an interval of six weeks, produced in most cases a level of circulating antitoxin believed to be adequate to afford temporary protection, and at the same time called into permanent existence a defensive mechanism capable, when stimulated by the presence of further quantities of toxoid (and presumably toxin), of turning out large quantities of antitoxin. Subsequent doses of toxoid produced both a higher level of circulating antitoxin and a more sensitive and more readily stimulated defensive mechanism. In the course of time there was a decline in the level of circulating antitoxin—i.e., antitoxin immediately available for the neutralisation of toxin—but the defensive mechanism, believed to be located in the reticulo-endothelial system, remained sensitised and ready to respond to further stimulus with tetanus toxoid or toxin.

METHODS OF IMMUNISATION ADOPTED IN THE PRESENT CAMPAIGNS

Active immunisation against tetanus by means of two doses of 1 c.cm. of tetanus toxoid given at an interval of six weeks was officially introduced into the British Army in 1938, and it is estimated that, at the time of the German invasion of Belgium and France, when the first heavy casualties were incurred, about 90% of the troops on the Continent were protected. Although the advantage of a third dose was fully realised, this was not made a standard procedure until January, 1941, mainly owing to difficulties in procuring the necessary supplies of toxoid. In Middle East (the theatre in which most casualties were being incurred at that time) this order took long to implement, because of the inevitable delay, through transport shortage, in getting supplies from home. Finally, in November, 1942, instructions were issued for an annual "boosting" dose of 1 c.cm. of toxoid to be given to all Service personnel. Before the invasion of Europe the troops in 21 Army Group were practically 100% inoculated. As an additional precautionary measure a special order was issued laying down that every man who had not already received one or more boosting doses—i.e., every man who had received only the initial two doses—should be given a third dose before going overseas. Inevitably a few managed to elude the net, but their number was small.

Passive immunisation was maintained as an additional precaution. Any wounded man who was not actively immunised was given three doses of 3000 international units of antitoxin at weekly intervals. Actively immunised men were given a single dose of 3000 units

TABLE I—INCIDENCE OF TETANUS IN BATTLE CASUALTIES IN EUROPEAN AND AFRICAN THEATRES OF WAR

Theatre	U.K. troops				Indian				U.D.F.				N.Z.				Australian wounded	Colonial wounded
	Wounded	Cases of tetanus		Rates °/₀₀	Wounded	Cases of tetanus		Rates °/₀₀	Wounded	Cases of tetanus		Rates °/₀₀	Wounded	Cases of tetanus		Rates °/₀₀		
		+	−			+	−			+	−			+	−			
B.E.F.	16,193	0	7	0·43	0	..	..	..	0	..	..	..	0	..	..	..	0	193*
Norway	404	0	0	0	0	..	..	..	0	..	..	..	0	..	..	..	0	0
M.E.F.	27,390	0	1	0·04	3330	1	2	0·90	3867	0	5	1·29	7238	2	0	0·28	8270*	0
Malta	565	1	0	1·77	0	..	..	..	0	..	..	..	0	..	..	..	0	145*
B.N.A.F.	20,838	0	1	0·05	787	0	0	0	29	0	0	0	1396	0	0	0	0	0
C.M.F.	70,319	7	0	0·1	15,019	1	0	0·07	3299	0	0	0	6649	1	0	0·15	0	375*
B.L.A.	103,343	3	3	0·06	0	..	..	..	0	..	..	..	0	..	..	..	0	0

+ = immunised with 2 or more doses of tetanus toxoid.
− = not immunised with 2 or more doses of tetanus toxoid; 3 doubtful cases are included in this category. * No cases of tetanus.

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as soon as possible after wounding. The object of this dose was to tide the man over the first critical week, during which his circulating antitoxin might be below the safety level. This procedure of combined active and passive immunisation was adopted in the United Kingdom, Australian, New Zealand, and Indian armies. In South African troops (U.D.F.) passive immunisation alone was used until 1942. In the Canadian and U.S.A. forces the troops were actively immunised in the same way as in the British Army, but when wounded were given, not antitoxin, but a further boosting dose of 1 c.cm. of tetanus toxoid, with the object of stimulating rapid antitoxin production.

INCIDENCE OF TETANUS IN BATTLE CASUALTIES

Table I gives an analysis of the incidence of tetanus in battle casualties in the different theatres of war and in the different forces. The total number of cases is 35, and the average per 1000 wounded (this figure includes "died of wounds") is 0·12. But it is to be noted that of the 35 cases no fewer than 16 were in men who had not been actively immunised. Cases which developed in non-battle casualties (18 in all) are not included in this table, as they cannot in any way be correlated to the number at risk. Of these 18, 5 were cases of miscellaneous origin in troops under training in the British Isles between Dunkirk and D-day, and 9 were from West Africa (6 of them in patients with ulcer of the foot). The remaining 50 cases which make up the total of 103 were in partisan troops or prisoners-of-war.

COMPARATIVE INCIDENCE OF TETANUS IN DIFFERENT CAMPAIGNS

It is of interest to compare figures from table I with others quoted in the Official Medical History of the War (1914–18).

Campaign	Incidence per thousand	Campaign	Incidence per thousand
British Legion in Spain (Peninsular war)	12·5	B.E.F., 1939–40 ..	0·43
Crimean war ..	2·0	M.E.F. (including Malta) 1940–45	0·22
American civil war	2·0	B.N.A.F.	0·04
Franco-Prussian war	3·5	C.M.F.	0·09
Western front, 1914–18	1·47	B.L.A.	0·06

The figures relating to the present war become the more striking when it is recalled that all the cases in the B.E.F. in 1939–40 were from among the unprotected 10%, and that 7 of the 11 cases in M.E.F. were not actively immunised.

FACTORS RESPONSIBLE FOR DECREASED INCIDENCE IN THE 1939–45 CAMPAIGNS

Terrain.—The tetanus bacillus normally passes a saprophytic existence in the large intestine of certain animals, and in their fæces, and is present in considerable numbers, either as the vegetative organism or as the very resistant spore, in soil into which such fæces have been mixed. Tetanus as a complication of war wounds is therefore a much greater risk when fighting takes place in agricultural countries such as north-west France and Flanders than it is in desert warfare. For this reason a high incidence was not anticipated in Middle East, where most of the battles were fought over sand, but in Italy and north-west Europe conditions were more favourable. Even in these countries, variations are found in different localities. This was brought out in the Franco-Prussian war, where in the fighting round Metz there were 1·6 cases of tetanus for each 1000 wounded, whereas in the more agricultural northern theatre the incidence was 11 per 1000. Most of the casualties on the western front in the war of 1914–18 were acquired in highly infected terrain, and it must not be overlooked that much of the fighting in the European campaign which has just finished took place in pastoral and industrial rather than in agricultural districts. There can be little doubt that this played some part in determining the low incidence of tetanus among battle casualties, but that it is far from being the only cause is shown by the relatively high incidence in prisoners-of-war, who were not actively immunised. Twenty-five such cases are included in the present series from the western front, and it is known that there were several more which were not reported. In Brussels a large German hospital was captured, and inquiries showed that this unit had handled considerable numbers of cases of tetanus—roughly about 100. If other German hospitals had a similar experience, it is obvious that the incidence among troops not actively immunised was by no means inconsiderable, and that the very low incidence among British troops (6 cases in the whole campaign) cannot be attributed to the absence of the infecting agent.

Surgery.—Efficient surgery, with careful wound toilet and the removal of dead tissue and foreign bodies, is of the greatest importance in preventing anaerobic infection, tetanus as well as gas-gangrene. This fact was just as well known in 1914–18 as it is now, and there is no reason to suggest that there is any striking difference in this aspect of surgical treatment in the two wars. It is therefore unlikely that the lowered incidence of tetanus can be attributed to better surgery.

Chemotherapy.—No data are available from which conclusions can be drawn about the part, if any, played in the prevention of tetanus by the routine administration of sulphonamide drugs to battle casualties. Varying quantities were administered to 6 of the 35 actively immunised casualties who developed tetanus, and to 25 of the 69 who were not actively immunised. Instructions were in force from the middle of 1941 for the administration of 20 g. of sulphanilamide over a period of four days to all battle casualties of any severity, but there are no accurate records to show what percentage of casualties actually received this treatment. Taking into consideration the fact that tetanus bacilli develop and multiply in dead tissue, where they are inaccessible to the action of sulphonamides, and that sulphonamides have only a limited action on this organism, it is doubtful if these relatively small quantities had any influence in preventing the development of the disease.

Penicillin.—"Prophylactic" penicillin was widely used in the more severely wounded casualties in B.L.A., and latterly in C.M.F., in quantities sufficient to produce in the blood an effective bacteriostatic concentration; this was maintained until the patient received definitive surgical treatment in a base hospital, and frequently for some days thereafter. As in the case of chemotherapy, there is no method of assessing the part which this played in preventing the development of tetanus, but such an action cannot be ruled out. Tetanus, however, is not confined to the more severe type of wound, and large numbers of trivial wounds, equally susceptible to tetanus infection, were not treated with penicillin. Its action in reducing the incidence of tetanus must therefore at best have been limited. Of the 9 actively immunised cases in C.M.F. 2 received prophylactic penicillin, and of 3 in B.L.A. 2 were treated in this way.

Passive Immunisation.—Though there is no means of proving, from the figures available, that passive immunisation played a part in controlling the incidence of tetanus in these campaigns, there is no reason to doubt that, as in the past, it did so. It cannot, however, be responsible for the striking difference between the incidence in the two wars, for prophylactic antitoxin was more freely and probably more carefully used in 1914–18 than in 1939–45.

Active Immunisation.—The figures quoted in table I show that active immunisation is not infallible in preventing the development of tetanus. This was hardly to be expected. On the other hand, there is much evidence to show that it was the principal cause of the

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encouragingly low incidence. The more salient features in this evidence may be briefly marshalled as follows:

(1) In B.E.F. 1939–40 (with little sulphonamides and no penicillin) there were 7 cases among the non-immunised 10% and no cases in the immunised 90%.
(2) In M.E.F. (where sulphonamides were used but no penicillin) there were 5 cases among 3867 South African wounded, none of whom were at that time immunised. Throughout the whole campaign there was only 1 case (immunisation doubtful) in U.K. wounded (27,390), none in Australian wounded (8270), and only 2 cases (both Maoris) in 7238 New Zealand wounded, and 3 cases (1 not immunised, 1 doubtful) in 3330 Indian wounded. The latter categories (exclusive of a small percentage) were all actively immunised.
(3) In B.L.A. there were 6 cases (3 immunised, 2 doubtful) among 103,343 wounded. The German Army was not actively immunised, and among the relatively small number of wounded who were captured (the exact total of wounded prisoners is not available) there were 25 recorded cases and 3 or 4 others of whom there are no records. Compared with the western front in 1914–18, the incidence is reduced from 1·47 per 1000 to 0·06, or, to put this another way, tetanus was 24·5 times commoner in 1914–18 than in 1944–45.

Exclusive of active immunisation, no one of the possible factors considered above, nor their sum, can explain these results, and there can be no doubt that active immunisation was the factor mainly responsible for the elimination of tetanus.

EFFECT OF IMMUNISATION ON SEVERITY OF TETANUS

The records of the war of 1914–18 demonstrate that prophylactic immunisation with tetanus antitoxin not only reduced the incidence of the disease but also lessened the average severity in those cases which developed in spite of it. This decrease in severity, as gauged by the case-mortality, was associated with a lengthened incubation period. In this report an attempt will be made to deal separately with the effect of passive and of active immunisation on the case-mortality and on the incubation period and to assess the relative severity of the symptoms in surviving cases among those who were actively immunised and those who were not.

It must be emphasised that, in the material available, the issue is not a straight one between immunisation and non-immunisation, and that many other factors, such as prophylaxis and treatment with sulphonamides and penicillin, the earlier treatment of British wounded than of prisoners-of-war (who constitute the bulk of the control), and the different methods of administering therapeutic antitoxin, have a bearing on the results. Nevertheless a careful study of the documents of these cases leaves no doubt that immunisation is the one matter of importance, and that other factors play a minor part.

For purposes of comparison, both with the figures of the last war and with the extracted figures which follow, it is of interest to strike a crude case-mortality rate and incubation period, irrespective of the influence of immunisation or any other factor, from all cases in the series in which data are available.

The crude case-mortality rate in all 103 cases is 46·6%. In the war of 1914–18 in the total of 2529 cases in British hospitals on the western front there were 1254 deaths, a case-mortality rate of almost exactly 50%.

The average incubation period in 92 cases in which information on this point is available is 15·9 days. Of the 92 cases, 87 range between 2 and 32 days, and the remaining 5 have apparent incubation periods of 54, 61, 66, 79, and 90 days. It is well known that tetanus spores can remain latent in a wound and be disseminated or activated by surgical interference or trauma. There is a record of such surgical interference in 2 of the 5 cases with long incubation; 2 others were Yugoslav partisans admitted to a British hospital when symptoms of tetanus developed, about whom no reliable information is forthcoming, and the 5th was an anomalous case in an Indian (McGill 1943) in whom for want of a more obvious cause the infection was attributed to two completely healed cuts on the hand. It is considered that these cases fall into the "latent" category, and that their inclusion falsifies the average. Excluding them, the average in the remaining 87 cases is 12·7%. In 1914–18 the peak of incidence was the 11th day.

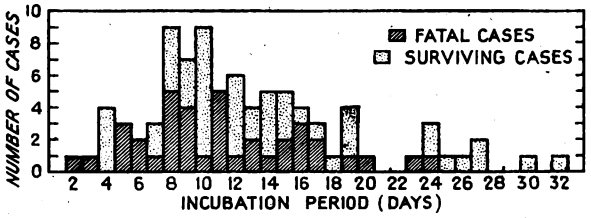

Fig. 1—Correlation of incubation period and case-mortality of tetanus.

Fig. 1 shows the incubation-period curve, together with the fatalities according to the day on which the symptoms of tetanus appeared, and table II compares the present series with cases in home hospitals in the war of 1914–18.

Effect of Active Immunisation on Case-mortality.—In analysing the case-mortality as influenced by active immunisation, three categories have been created: (1) "protected," in which are placed those who have been immunised by two or more doses of tetanus toxoid given at the regulation intervals; (2) "unprotected," where no tetanus toxoid has been administered; and (3) "incomplete or doubtful," which includes those who have had only one dose of toxoid and those who believe they have been inoculated but have no written record or clear recollection.

TABLE II—INCUBATION PERIOD AND CASE-MORTALITY

Incubation period (days)	Case-mortality %		
	All cases 1939–45	Not actively immunised only	Home hospitals, 1914–18
Less than 10 ..	48·7	61·1	55·6
11–22	47·4	50	35
Over 22.. ..	26·7	16·6	17

Table III gives the details of incidence and fatalities in the different theatres and nationalities. The case-mortality rates in the three categories show little variation from one another and from the overall average of 46·6%.

In battle casualties alone the figures are rather different, the case-mortality being 26·6% in the "protected" category, 33·3% in the "non-protected," and 28·6% in the "doubtful or incomplete." The recovery-rate is therefore higher in the protected than in the unprotected series, but not strikingly so.

If the details of nationality in table III are examined, it will be seen that the case-mortality rate is much lower among white troops than in the others.

Actively Immunised Troops	*Cases*	*Deaths*	*Case-mortality %*
White	14	4	28·6
Others	8	7	87·5

At first sight this suggests some racial difference in response to immunisation or in susceptibility, and such may indeed exist; but a closer examination shows that several cases in the second group were non-battle casualties and were not given prophylactic antitoxin. In all, 10 of the 14 white troops were both actively and passively immunised, and only 1 of the 8 coloured troops. Only 2 men who were both actively and passively immunised died. It is therefore probable that the lower case-mortality is attributable to this rather than to any

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TABLE III—INCIDENCE AND CASE-MORTALITY OF TETANUS IN THE DIFFERENT THEATRES; ALL KNOWN CASES INCLUDED

Deaths in parentheses

Force	Nationality	Total cases	Protected	Unprotected	Incomplete or doubtful
B.E.F. 1939–40 ..	British	8	..	8 (3)	..
	French	1	..	1 (0)	..
Miscellaneous, U.K., Dunkirk to D-day ..	British	4	..	2 (2)	2 (1)
	French	1	..	1 (0)	..
M.E.F. including Malta	British	2	1 (1)	..	1 (0)
	N.Z.	2	2 (1)	..	..
	U.D.F.	6	..	5 (2)	1 (0)
	Indian	4	1 (1)	1 (0)	2 (1)
	Misc.	2	..	2 (0)	..
	Italian	6	..	2 (2)	4 (2)
	German	5	..	5 (5)	..
B.N.A.F. ..	British	1	..	..	1 (0)
	German	1	..	1 (0)	..
C.M.F. ..	British	9	9 (3)	..	..
	N.Z.	1	1 (0)	..	..
	Indian	1	1 (1)	..	..
	Partisan	4	..	4 (1)	..
	Italian	1	..	..	1 (1)
	German	3	..	3 (3)	..
B.L.A. ..	British	6	3 (0)	..	3 (1)
	French	1	..	1 (0)	..
	German	25	..	25 (11)	..
West Africa	W.A.	9	4 (4)	1 (0)	4 (2)
Totals ..		103	22 (11)	62 (29)	19 (8)
Case-mortality rate ..		..	50%	46·8%	42·1%

Protected = inoculated with 2 or more doses of tetanus toxoid.
Unprotected = not inoculated with tetanus toxoid.
Incomplete or doubtful = inoculated with 1 dose of tetanus toxoid, or believe vaguely that they have been inoculated but have no written record. Italian P.O.W. have been placed in the doubtful category, as captured T.A.B. vaccine was found to contain tetanus toxoid.
All who were certain that they had been inoculated were placed in the "protected" category, even in the absence of documentary evidence.

racial difference, but the figures are too small to allow any definite conclusion to be drawn, and the possibility of variations in racial susceptibility cannot be altogether dismissed.

The correlation of fatalities with the number of doses of toxoid is shown in table IV, in which figures for British, Indian, and Dominion battle casualties are given separately. Of the 5 cases in the latter category included under the heading "Doubtful," 4 probably

TABLE IV—TETANUS CASES AND DEATHS CORRELATED WITH NUMBER OF DOSES OF TETANUS TOXOID

Deaths in parentheses

No. of doses of tetanus toxoid	Doubtful	1 dose	2 doses	3 doses	4 doses	5 doses
All cases in protected and doubtful categories ..	13 (5)	6 (3)	8 (5)	8 (6)	4 (0)	2 (0)
British, Indian, and Dominion battle casualties only ..	5 (1)	2 (1)	5 (2)	4 (2)	4 (0)	2 (0)

received two doses of toxoid, although the evidence is flimsy. It will be observed that no deaths occurred in those who had received the initial two-dose inoculation plus two or more annual "boosting" doses.

Effect of Passive Immunisation on Case-mortality.—Data regarding passive immunisation and case-mortality are available in respect of 102 cases. Of these, 37 received prophylactic antitoxin and showed a case-mortality rate of 37·8%; 65 were not passively immunised and had a case-mortality rate of 50·8%. None of the casualties in this series were given the three weekly doses of antitoxin, which, according to current instructions, should be administered to every wounded man who has not been actively immunised. This may imply either that such treatment was 100% successful in preventing tetanus, or that it was not carried out. The latter explanation, if less flattering to Army discipline, is the more probable, since the extreme rarity of tetanus, coupled with the sense of security afforded by more or less universal active immunisation, bred laxity in antitoxin administration.

These figures acquire greater significance when analysed in terms of active immunisation (table V).

In those who have not been actively immunised the effect of prophylactic antitoxin in lowering the case-mortality is insignificant. In those who have been actively immunised the effect is significant, in so far as reliance can be placed on the limited numbers available. The possible cause of this striking difference will be discussed when further contributory factors have been analysed.

Effect of Active Immunisation on Severity of Symptoms in Non-fatal Cases.—With the limited data available the assessment of severity in the non-fatal cases is difficult. Four arbitrary categories have been made as follows:

(1) Local tetanus, with twitchings or spasm confined to the muscles at the site of injury.
(2) Trismus, alone or accompanied by spasticity in certain groups of muscles but without recurring tonic spasms.
(3) Trismus, accompanied by recurring spasms, usually but not always generalised.
(4) Generalised spasms without trismus. (Because of faulty records, some of the cases placed in this group may really belong to category 3.)

The necessary information for the categorisation was available for 39 of the 55 non-fatal cases. Within these groups the duration of the symptoms of tetanus give some index of the severity (table VI). This table shows that symptoms passed off much quicker in those who

TABLE V—EFFECT OF ACTIVE AND PASSIVE IMMUNISATION ON CASE-MORTALITY

—	Actively immunised		Not actively immunised		Incomplete or doubtful	
	Proph. A.T.S.	No proph. A.T.S.	Proph. A.T.S.	No proph. A.T.S.	Proph. A.T.S.	No proph. A.T.S.
Cases and deaths *	11 (2)	11 (9)	23 (10)	39 (19)	3 (2)	15 (5)
Case-mortality rate %	18·2	81·8	43·8	48·7	66·6	33·8

* Deaths in parentheses.
Total: 102 cases. No records available in 1 case.

were actively immunised than in those who were not. Apart from one case of local tetanus which persisted for eighteen days and disappeared only when the badly damaged limb in which it occurred was amputated (a sequence of events which casts some doubt on the ætiology of the spasm) and one case of trismus (the one surviving case in the "coloured" series) which lasted seven days, symptoms in the actively immunised disappeared in from one to four days. Of the 27 cases in men not actively immunised, only 4 had recovered within four days, and 13 had symptoms which persisted for ten days or more. These figures provide clear evidence that, in surviving cases, the course of the disease is less severe, and that recovery is more rapid in those who have been actively immunised than in those who have not.

Effect of Immunisation on Incubation Period.—Much information of interest is to be obtained from a study of the relationship of the incubation period to immunisation and in particular to active immunisation. The influence of *passive immunisation* alone may be dismissed in a few words. The relevant figures (table VII) include only those men who have not been actively immunised. Passive immunisation leads to a slight lengthening of the incubation period—i.e., there are approximately 5% less cases in the one to eleven days period and 6% more in the twenty-two days and over period. These figures refer to patients who have received only one prophylactic dose of antitoxin. The more striking results

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obtained in the war of 1914–18 included many cases which had been given three or more doses of antitoxin.

In *actively immunised* cases the incubation period is significantly reduced, the average being 9·6 days. The distribution of incubation periods in this series and in

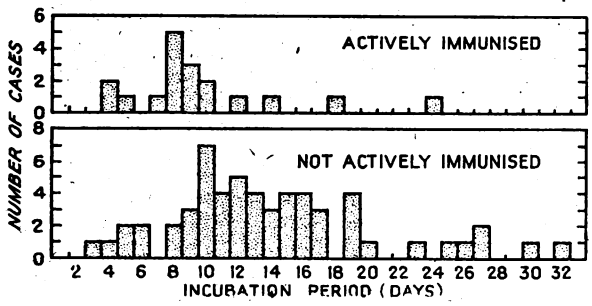

Fig. 2—Comparison of incubation period in actively immunised and not actively immunised patients with tetanus.

the cases not actively immunised is shown in fig. 2. Cases in the "doubtful" series are not included, since this would not serve any useful purpose.

All but 4 of the cases in the actively immunised series have an incubation period of ten days or less, and in 2 of the 4 cases with a longer incubation period (those of eighteen and twenty-four days) there is a history of surgical interference eleven and ten days before the onset of tetanus. It is possible that these lower figures may represent the true incubation period. This consistently short incubation period is in well-marked contrast to that of the non-immunised series, in which the majority of cases developed symptoms from the tenth day onwards.

Interpretation of These Findings.—To interpret these findings, it is necessary to correlate them with results which have been obtained by experimental methods. If a man who has previously been actively immunised with tetanus toxoid is given a further "booster" dose, the antitoxin content of his blood begins to rise about the fifth day, and reaches its peak from the tenth to the twelfth day, by which time the level is usually 2 units or more per c.cm. It may be presumed that in this respect tetanus toxin has an action similar to toxoid, and that toxin entering the body from an infected wound

TABLE VI—DURATION OF SYMPTOMS IN NON-FATAL CASES

Type of symptoms	Duration of symptoms (days)										
	1	2	3	4	5	6	7	8	9	10	Over 10
Local spasms ..	..	..	*1*	1	1	..	..	..	..	..	*1* 2
Trismus with spasticity ..	..	*1*	*1*	..	..	1	*1*	..	..	1	2
Trismus with tonic spasms ..	*1*	..	..	*1*	1	..	2	3	..	1	.. 5
Tonic spasms without trismus ..	..	*3*	1	..	1	1	..	..	..	1	.. 3
Totals ..	*1*	*4*	1	*2*	*1*	3	2	3	*1*	3	.. 2 1 *1* 12

Italic numerals = cases in actively immunised subjects.
Ordinary numerals = cases in subjects not actively immunised.

stimulates the production of antitoxin in the same way as toxoid. There is therefore a progressive reinforcement of circulating antitoxin from the fifth day after infection onwards, and by about the tenth day a high concentration will have been reached.

The mechanism of active-immunity may be regarded as functioning in two consecutive phases: first, neutralisation of toxin by preformed antitoxin (deriving from the last inoculation with tetanus toxoid) which is circulating in the blood-stream; and secondly, at a later stage, neutralisation of toxin by antitoxin newly fabricated as the result of the toxin stimulus to the previously sensitised reticulo-endothelial system. When the level of preformed circulating antitoxin is sufficiently high, the two phases overlap, and the development of symptoms of tetanus is prevented. Theoretically, protection may break down through the failure of one or both of these phases.

The salient features of the results which have just been analysed may be rearranged and summarised as follows:

(1) In men who have previously been actively immunised, the incubation period rarely exceeded ten days. In the majority of men who were not actively immunised, the incubation period was more than ten days.
(2) In actively immunised men who survived, the duration of the symptoms was significantly shorter than in those who were not actively immunised.
(3) Active immunisation combined with prophylactic antitoxin produced significant lowering of the case-mortality.

When these facts are examined in terms of the two-phase process of immunisation which has been outlined, it will be seen that they dovetail closely into this conception, and find their explanation in a breakdown of the first phase, with the second phase functioning normally in due course. This accounts for the restriction of onset to the first ten days after infection, for the rapid recovery of surviving cases, and for the beneficial

TABLE VII—EFFECT OF PASSIVE IMMUNISATION ON INCUBATION PERIOD IN SUBJECTS NOT ACTIVELY IMMUNISED

—	Cases	Average incubation (days)	Incubation 1–11 days	Incubation 12–22 days	Incubation over 22 days
Prophylactic A.T.S. ..	23	14·9	34·8%	47·8%	17·3%
No prophylactic A.T.S.	35	13·8	40%	48%	11·4%

action of prophylactic antitoxin, which reinforces the inadequate initial level of antitoxin until the second phase begins to operate.

CAUSES OF FAILURE OF ACTIVE IMMUNISATION

It has been shown that the danger period for those who have been actively immunised lies in the ten days which follow the implantation of infection, and that failure of active immunisation must be attributed to lack of protection within this period. In a previous report (Boyd and MacLennan 1942) it was suggested that failure might be due to one of two causes: either to an excessive volume of toxin coming from a massive infection of tissue and reaching beyond the "ceiling" of normal immunity; or conversely to defective response to immunisation with antitoxin below the level required to neutralise the average infection. Of the 22 failures in this series, 6—of which 2 have already been described (Boyd and MacLennan 1942)—might be attributed to massive infection, as extensive muscle damage was present. In the remaining 16, breakdown can only be attributed to an inadequate level of preformed antitoxin. This may be due, as already suggested, to defective response to immunisation, but another possible cause is a decline in antitoxin titre through lapse of time since the last inoculation of toxoid. In 14 of the 16 cases information on this point is available, as follows:

Months since last inoculation	*0–6*	*7–11*	*12 and over*
Cases	6	1	7
Deaths	6	0	2

Of the 6 cases which developed within six months of the last dose of toxoid, 4 were in West Africans and 2 were in Indians. All 6 ended fatally. Here again the possibility of some racial factor presents itself, either lack of response to immunisation or undue susceptibility to infection. It is tempting to suggest that infections appearing less than six months from the last inoculation

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are likely to arise in those who have not responded to immunisation, and that those in the second group, cases twelve months or more from their last inoculation, may be put down to attenuation of an antitoxin concentration which at an earlier date was adequate. It is unwise, however, to base any conclusions on such a limited number of cases.

Proof of the correctness or otherwise of these hypotheses could be obtained by carrying out titrations of a series of specimens of blood from cases at different stages, but in the confusion and rush of active service no opportunity has arisen to do this.

METHODS OF REINFORCING ACTIVE IMMUNITY IN THE WOUNDED

Whatever the cause, a small proportion of those who have been actively immunised possess an inadequate level of circulating antitoxin and in consequence are liable when infected to develop symptoms of tetanus. This possibility was foreseen, and measures were adopted to overcome it.

In the British Army the method adopted was to administer a dose of 3000 international units of antitoxin to all wounded men. It has been seen that this had a significant action in lowering the mortality; and, although it is impossible to produce figures to prove it, there can be no doubt that it also prevented the development of symptoms in borderline cases.

In the Canadian and U.S.A. armies it is not the practice to administer prophylactic antitoxin. Instead, each wounded man is given a dose of 1 c.cm. of toxoid to stimulate early antitoxin production. A consideration of the facts discussed above will show that this can do nothing towards enhancing immunity in the first phase, and that it can only exert its influence on the second phase. The results just detailed, however, indicate that the stimulus given by the toxin absorbed from the wound is adequate for this purpose. Nevertheless it is possible that a dose of toxoid administered *immediately* after wounding might, by providing a powerful stimulus at an early stage, accelerate the development of the second phase.

Three of the cases under review were given tetanus toxoid instead of antitoxin immediately after they were wounded. One of them had not been actively immunised; hence no result could be expected. The second had previously received only one dose of toxoid three months before being wounded; the incubation period in this case was eight days, and the patient recovered. The third case had previously received primary inoculation (two doses) and three "booster" doses. He was given 1 c.cm. of tetanus toxoid on the day he was wounded and developed tetanus ten days later, which indicates that no very definite acceleration of the second phase had occurred. Full information on the value of this method will be available when the Canadian and American results are published.

The weightiest argument in favour of antitoxin as opposed to toxoid is that the former affords some measure of cover for the non-reactor, or poor reactor, or person whose circulating antitoxin has dwindled in the course of time, none of whom could gain immediate benefit from a dose of toxoid. Until some foolproof method is evolved which ensures that active immunisation is invariably successful, and that adequate antitoxin is always present in the circulation, it appears necessary to supplement active immunisation with passive immunisation if the best results are to be obtained.

RESULTS OF THERAPEUTIC MEASURES

Antitoxin.—No specific instructions were issued on the dosage of antitoxin in the treatment of tetanus, and administration followed the ideas of the individual medical officer. In consequence the variations in the quantity given were considerable, and in some cases the intravenous route was used, in others the intramuscular, and in a few the intrathecal. So few and so scattered were the cases that, with rare exceptions, each was treated by a different doctor. In the circumstances it is very difficult to determine the value of the different doses and routes of administration, especially so far as the milder cases are concerned, but some information can be gained from a study of the more severe cases. For this purpose these have been defined as cases in which generalised convulsions developed. Cases with complications such as pneumonia have been excluded, as have also all those who were actively immunised, and there remain 38 cases of whom there are adequate records. A study of the antitoxin treatment received by these cases shows that the only factor with any apparent relationship to the recovery-rate was the early administration of large doses by the intravenous route. The figures in table VIII compare the case-mortality rates in those who received 100,000 units or more intravenously within thirty-six hours of the first appearance of symptoms and in those who received smaller doses or were treated by the intramuscular route.

TABLE VIII—CASE-MORTALITY RATE IN RELATION TO ANTITOXIN TREATMENT

—	Cases	Deaths	Case-mortality %
Total in series	38	21	55
Treated within 36 hours of onset with 100,000 units or more ..	18	7	39
Not so treated	20	14	70

Many of the cases which ended fatally showed for the first twenty-four hours or longer only mild local symptoms or trismus, and, presumably because of the mildness, heroic treatment was not immediately instituted. It appears advisable to give massive doses intravenously to all cases as soon as symptoms are observed, irrespective of their severity. These observations support the recommendation made by Cole (1942), that cases should be given a single large dose of 200,000 units intravenously as soon as possible, with, in severe wounds, a repeat dose of 50,000 units weekly until spasms have ceased, or before any operation.

One patient died from anaphylaxis a few minutes after being given a dose of 120,000 units of antitoxin; a sensitivity test had been carried out, but unfortunately sufficient time was not allowed for the reaction to develop.

Sedatives were used in most cases to control reflex spasm, but in many of the report-forms no specific details are given. Paraldehyde per rectum was most commonly used and appears to have been of value. There are records of its administration in 15 non-fatal and 14 fatal cases. 'Avertin' was administered to 1 non-fatal case and to 4 fatal cases, and 'Pentothal' to 8 cases in all, 4 of whom died. There is no evidence that these drugs had any life-saving properties, though they were undoubtedly of value in relieving symptoms. In some cases spasm, and even trismus, was abolished by their use, but in spite of this the patient's condition continued to deteriorate, and death ensued. Other sedatives, such as chloral hydrate, bromide, morphine, and barbiturates, were freely used, but were clearly palliatives and had no influence on the progress of the disease.

Penicillin.—10 cases were given penicillin treatment in addition to other measures; 4 died and 6 recovered, but of the survivors 4 had also been actively immunised, and the other 2 received massive doses of therapeutic antitoxin intravenously on the first day of the disease. On theoretical grounds, penicillin can be of no benefit to an established case of tetanus except as an adjuvant to the surgical treatment of the infected wound.

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MISCELLANEOUS

The following miscellaneous items may be of some interest.

Incidence of Tetanus in relation to Site of Injury.—Details of the site of injury are available in 86 of the cases (non-battle casualties, &c., are included) and are set out in table IX.

TABLE IX—INCIDENCE OF TETANUS IN RELATION TO SITE OF INJURY

—	Cases	Incidence % of total	Died	Case-mortality %
Multiple injuries..	22	25·6	11	50
Head, face, neck	2	2·3	1	..
Trunk	6	7·0	2	..
Upper extremity	14	16·3	6	43
Lower extremity	42	48·8	17	40

These figures are of little value unless they are correlated with others showing the relative frequency of wounds of these different sites; these are not yet available.

Eleven cases, 4 of them fatal, resulted from trivial injuries; 5 of these (3 fatal) were injuries to the hand or fingers. Six cases, all in West Africans, originated from ulcers of the foot; 5 were fatal.

Tetanus following Thermal Injuries.—In 3 cases tetanus followed thermal injuries. The first occurred in a case of frostbite in a French Chasseur Alpin in Norway, in whom the toes of both feet were affected; symptoms of tetanus appeared three days after the frostbite developed, and the patient died twenty-four hours later. The second case—in a South African coloured soldier—had petrol burns of the 2nd or 3rd degree; tetanus set in on the 17th day, and death took place three days later. The third was a German prisoner, captured after fighting four or five days in a cold flooded position; he developed bilateral trench-foot, with gangrene of all the toes of the left foot to their bases and of the tips of the toes of the right foot. Tetanus supervened on the 15th day, and he died after five days' illness. None of these cases was actively immunised or received prophylactic antitoxin.

Bacteriology.—Cultures from several cases were obtained and examined by Major J. D. MacLennan, M.B.E., R.A.M.C. Those from M.E.F. have already been reported but are repeated in table X.

TABLE X—TYPES OF *Clostridium tetani* ISOLATED

Theatre	Type of *Cl. tetani*								Total
	1	2	3	4	5	6	7	New type	
M.E.F.	1	..	2	..	4	..	2	1	10
B.L.A.	5	1	4	2	..	..	..	..	12

SUMMARY AND CONCLUSIONS

The incidence of tetanus in the African and European campaigns has been negligible. This is chiefly attributable to active immunisation with tetanus toxoid.

Active immunisation did not prevent the development of tetanus in 22 cases.

The case-mortality rate among the actively immunised did not fall below the average, but it is noteworthy that the majority of fatal cases were in coloured troops.

The case-mortality rate in actively immunised men who were given prophylactic antitoxin was significantly lowered.

The duration of the symptoms in actively immunised men who survived was also significantly lowered.

The incubation period in the actively immunised rarely exceeded ten days, whereas in most of those who were not actively immunised the incubation period was more than ten days.

Failure of active immunisation appears to be attributable to an inadequate level of circulating antitoxin in the early stages of infection and is more likely to be remedied by prophylactic antitoxin than by a "booster" dose of toxoid.

Therapeutic antitoxin, to be effective, must be given as early as possible in large doses by the intravenous route.

Sedatives, including avertin and pentothal, did not influence the course of the disease, although they were effective in relieving symptoms.

My thanks are due to the late Director of Pathology, Major-General L. T. Poole, C.B., D.S.O., M.C., K.H.P., for allowing me access to many of the records from which this report is compiled, and for providing me with various statistical data; to the officers who compiled the official forms; and to Major J. D. MacLennan, M.B.E., R.A.M.C., who tracked down many of the cases in prisoners and carried out the bacteriological investigations.

REFERENCES

Boyd, J. S. K. (1938) *J. R. Army med. Cps*, 70, 289.
— MacLennan, J. D. (1942) *Lancet*, ii, 745.
Cole, L. (1942) *Brit. med. J.* ii, 550.
McGill, R. J. (1943) *Ibid*, i, 40.
Ramon, G., Zoeller, C. (1927) *Ann. Inst. Pasteur*, 41, 803.

TUBERCULOUS RHEUMATISM

WILFRID SHELDON
M.D. Lond., F.R.C.P.
PHYSICIAN TO THE CHILDREN'S DEPARTMENT, KING'S COLLEGE HOSPITAL; PHYSICIAN TO OUTPATIENTS, HOSPITAL FOR SICK CHILDREN, GREAT ORMOND STREET

TUBERCULOUS rheumatism is a term applied to an active tuberculous infection shortly preceded or accompanied at some time in its course by rheumatic phenomena. There can be no doubt that such cases exist, and French writers suggest that they are fairly common, although cases reported in English writings are so rare that the condition in this country must be either very uncommon or else possibly overlooked. During the last 8 years I have recognised only 6 cases, which form the basis of this paper. Findlay (1920) regarded the condition as very rare but recorded 3 cases, which are summarised in this article. Nathan Raw (1914) could find no instance among 6000 patients with pulmonary tuberculosis.

In their book, *Le rheumatisme tuberculeux*, Poncet and LeRiche (1909) divided the cases into primary and secondary groups, a primary case being one in which the rheumatic reaction precedes the appearance of tuberculosis, and a secondary case one in which the course of tuberculosis is interrupted by rheumatic symptoms. They pointed out that the rheumatism has little bearing on the prognosis of the tuberculosis. They also described 3 main clinical forms of tuberculous rheumatism: (1) arthralgia; (2) acute rheumatism, further subdivided into acute arthritis developing alone and acute arthritis developing in conjunction with inflammation of serous membranes, especially pericarditis; and (3) chronic rheumatism or rheumatoid arthritis. This convenient classification will be followed here.

ARTHRALGIA

The child with tuberculous arthralgia complains of pains in the limbs, usually near joints. The pains tend to flit from joint to joint but are unaccompanied by heat, swelling, or redness. They may persist for several weeks and often precede for some time the appearance of definite tuberculous lesions.

Pains with these characters, often termed growing pains and referred to by some authorities as subacute rheumatism, are a commonplace in any children's outpatient clinic. They are often a manifestation of fatigue or debility and as such are related to many disorders of childhood. They are undoubtedly met with in children who exhibit other evidence of frank rheumatism, such as carditis and chorea, but so frequently accompany or follow conditions that bear no relation to frank rheumatism, such as asthma (Bray 1931), debility, and

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infectious fevers, that their claim to be rheumatic rests on no sure foundation. There can therefore be little surprise if they appear from time to time in children who later show evidence of tuberculosis, but they cannot be regarded as a warning of oncoming tuberculosis any more than they foreshadow either asthma or rheumatic carditis.

The following case is an example of the arthralgic type of tuberculous rheumatism.

CASE 1.—A girl, born in 1932, was evacuated into Sussex in 1939. Her previous health had been good, and a Mantoux test (1:1000) in 1937 had been negative. She returned to London in May, 1943, looking out of sorts and complaining of pains in her feet, calves, and thighs and between her shoulder-blades but not in her joints. A tuberculin patch-test in October, 1943, was negative. The following month she was admitted to a convalescent home, where her health slowly improved until January, 1944, when for one day she complained of pain in the right knee and ankle. There was no swelling or redness of these joints, but examination next day revealed palpable glands in the mesentery to the right of the umbilicus. Radiography showed calcifying glands in this area, and a Mantoux test (1:1000) was positive. The erythrocyte sedimentation-rate (E.S.R.) was raised to 27 mm. in 1 hr and did not reach normal until 5 months later, when she was gaining weight satisfactorily and her glands were considered to be healed.

One of Findlay's (1920) cases also falls within this category. It concerned a girl who for 6 months complained of pain in various joints, the pains flitting from joint to joint, but the joints never appeared swollen, and the pains were at no time severe enough to keep her indoors. During the last month she developed an abscess at the site of a tuberculous cervical gland. Her tuberculin skin tests were positive.

ACUTE RHEUMATISM

The child with acute tuberculous rheumatism has an acute polyarthritis, which may exactly reproduce the picture of rheumatic fever, joints being involved one after the other and becoming either swollen, hot, red, or tender, but not suppurating. Since in some instances the arthritis may be accompanied by inflammation of the serous membranes, especially pericarditis, the difficulty in singling out those cases that are tuberculous rather than rheumatic can well be imagined. The duration of an attack varies from a few days to several weeks, and, as in rheumatic fever, there is a tendency to recur after an interval of months or years. There is some evidence that the effect of salicylates is disappointing in the acute polyarthritis of tuberculous rheumatism; if this could be shown to be usual, a differentiating feature of considerable value would be established, but unfortunately the number of cases is too small for a reliable judgment. It can, however, be said that the signs of arthritis may subside in a week or so even without salicylates, which adds to the difficulty of assessing the virtue of these drugs in tuberculous rheumatism.

The division of this group by Poncet and LeRiche (1909) into those showing arthritis alone and those in which the arthritis is accompanied by inflammation of serous membranes seems unnecessary. It does, however, prompt one to be on the watch for instances where a fleeting pericarditis, without an accompanying arthritis, may prove to be a warning of recent tuberculous infection. I am not aware of any such instance being placed on record.

Four children falling within the group of acute tuberculous rheumatism have come within my experience.

CASE 2.—A girl, born Oct. 13, 1935, was said to have had subacute rheumatism in 1942, for which her tonsils and adenoids were removed. She attended the outpatient department on July 17, 1944, with a 2-months' history of pains in the hips and the back of the neck, relieved by rest. For a week the right knee and ankle had been swollen. An effusion into both these joints was noted. The heart was normal. She was admitted to hospital that day as a rheumatic child, and her E.S.R. was raised to 37 mm. in 1 hr. With rest in bed, but without salicylates, the joint swellings subsided in 2 days, and the movements of the joints became full. Three days after admission she was transferred to a convalescent home, but a week later she began to show signs of tuberculous meningitis, from which she died on Aug. 8.

At necropsy a calcified focus of primary tuberculosis in the lower lobe of the left lung and changes of tuberculous meningitis were found. The heart was normal.

CASE 3.—A boy, born in 1935, was treated at home in February and in May, 1944, for two attacks of rheumatic fever. A month later he was seen because his heart was thought to be affected. The heart was neither enlarged nor rapid, but a soft systolic bruit was detected at the apex after exercise. A convalescent regime for 6 weeks was advised, and the boy was not seen again until Sept. 14, 1944, when he was admitted to hospital with tuberculous pleurisy with effusion of a week's duration. At that time the tuberculin skin tests (patch, jelly, and Mantoux) were strongly positive, and a guineapig inoculated with some of the pleural fluid developed tuberculosis. The pleural effusion slowly absorbed, and 9 months later the boy was regarded as fully recovered.

The diagnosis of tuberculous rheumatism in case 3 rests on the two attacks of rheumatic fever. It was not until the diagnosis of tuberculosis had been made that the story of these attacks was closely scrutinised. The parents then stated that in each attack the boy had pains in his wrists, ankles, and one thumb, but that the pains were never more than slight, nor were the joints swollen, red, or tender, except for a slightly swollen and tender "big thumb joint." In each attack the temperature had ranged round 100° F for 2 or 3 weeks and was uninfluenced by treatment with aspirin. The relative mildness of these two attacks, their lack of response to aspirin, and their duration indicate variations from the usual picture of streptococcal rheumatic fever.

CASE 4.—A girl, born in April, 1943, was admitted to her local hospital a year later with a diagnosis of rheumatic fever. Her temperature was 104° F, and both ankles and the left knee were swollen, red, and painful. She was treated with rest and sulphadiazine, and her symptoms cleared up in 3 days. Two days later she developed purpura, followed by otitis media and mastoiditis, and then measles and bronchopneumonia, for which she was transferred to a fever hospital. She was readmitted to her local hospital in August, 1944, with bronchopneumonia, but radiography of her chest suggested tuberculosis, and in September she was transferred to an E.M.S. children's hospital.

On admission there she had a chronic discharging mastoid from which *Staphylococcus aureus* was cultured. The left upper lobe was solid, and radiography showed what appeared to be miliary tuberculosis in the right lung. The tuberculin patch test was strongly positive after only 12 hours' contact with the skin, and tubercle bacilli were recovered from the gastric washings and from the stool. The child's condition slowly deteriorated, and she died in March, 1945. Necropsy showed extensive caseous tuberculosis in the left lung and generalised miliary tuberculosis.

CASE 5.—A boy, born in 1925. On June 1, 1936, his temperature rose to 103° F, and his knees became swollen and painful, other joints becoming involved during the next few days. After 3 weeks' domiciliary treatment for rheumatic fever he was thought to have a cardiac lesion and was transferred to his local hospital, where he remained until October, 1936. He spent the next 4 months at home, and during that period he had albuminuria, intermittent pyrexia, and pains in his wrists and ankles.

On Feb. 27, 1937, he was admitted to a London hospital because of his heart. Cardiac dullness extended from the right of the sternum to the left midaxillary line; systolic retraction was noted, but there were no murmurs. Acute rheumatic carditis with pericardial effusion was diagnosed.

The boy steadily improved and in May, 1937, was transferred to a convalescent home, where in July he had a sudden hæmaturia. On July 31, 1937, he was admitted to King's College Hospital. The heart was enlarged one finger-breadth outside the left nipple line, and the cardiac impulse was visible over the whole præcordia, suggesting an adherent pericardium. No murmurs were audible. Radiography showed a focus of tuberculosis the size of a shilling near the root of the left lung. A 24-hour specimen of urine contained tubercle bacilli, and an intravenous pyelogram indicated bilateral cortical tuberculosis. The Mantoux test (1:1000) was violently positive.

The boy remained in hospital 3 months, putting on 9 lb. in weight. During this period the knees and ankles at times became swollen, tender, and slightly red, accompanied by fever to 100° F. Treatment with aspirin had no appreciable

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effect, but after a few days of immobilisation of the joints with splints the swellings and fever would subside, to reappear 2 or 3 weeks later. Meanwhile the general condition continued to improve, and in October, 1937, the boy was transferred to a sanatorium.

Reviewing case 5 in retrospect, it seems that tuberculosis was the primary disease. It is impossible to say whether the initial infection was related to the first attack of rheumatic fever, but the subsequent history suggests that the boy then developed a tuberculous pericarditis, followed by renal tuberculosis, the course being punctuated by mild attacks of secondary tuberculous rheumatism simulating mild rheumatic fever.

Two of the three cases recorded by Findlay (1920) resemble the last case in that they showed evidence of pericarditis. One was a boy, aged 8 years, who had had growing pains for some months. Latterly he had become tired and breathless, and was found to have pericarditis. His tuberculin skin test was positive. The pericarditis cleared in a fortnight, to be followed 6 weeks later by plastic peritonitis and still later by the breaking down of a tuberculous cervical gland. The other was a boy, aged 9 years, who had had rheumatic fever lasting 7 weeks, from which a good recovery was made. Three months later he had generalised pains severe enough to prevent him from lifting his legs, and a month later he developed pericarditis with friction sounds and a right-sided pleurisy. A week later symptoms of tuberculous meningitis appeared, and the boy died. Necropsy showed a fibrinoplastic pericarditis and pleurisy, with tuberculous consolidation in the right lung and mediastinal glands.

CHRONIC RHEUMATISM (RHEUMATOID ARTHRITIS)

One instance of this form of tuberculous rheumatism has been encountered:

CASE 6.—A girl, born on Aug. 30, 1939. In 1942 she was evacuated to Sussex and on Sept. 12, 1944, was admitted to an E.M.S. children's hospital because of a swelling of the left wrist. The school-teacher had noticed that the child had seemed poorly and tired for a few weeks. On admission there were fusiform swellings of both wrists, both knees, and the left ankle. These joints were only slightly painful, but movement was restricted. The lymph-glands in the axillæ and groins were enlarged, and the spleen was just palpable. Temp. 99° F. Wassermann reaction negative. Hb 80%. E.S.R. 48 mm. in 1 hr. Rheumatoid arthritis (Still's type) was diagnosed, and a course of 'Myocrisin' 0·4 g. was given.

A month after admission the abdomen was noticed to be becoming tumid and resistant, and a mass of glands could be felt in the right iliac fossa; a month later a sausage-shaped mass had developed across the abdomen at the umbilical level, typical of a tuberculous omentum. The tuberculin patch test was strongly positive.

During the next 8 months the child slowly improved, but at the time of writing the omental mass, although smaller, can still be felt with ease. The spleen is no longer palpable. The joints originally affected still show slight swelling but are painless, and, except in the right wrist, their range of movement is full. The child has been afebrile for 3 months.

DISCUSSION

The question must arise whether the instances of tuberculous rheumatism cited above were in fact examples of ordinary acute rheumatism associated with preceding streptococcal infection and happening to coincide with, or be followed by, tuberculous infection. In this connexion the lack of any history of preceding streptococcal infection must be noted. A point of greater significance emerges from an analysis of the "rheumatic" features of the foregoing cases; for, although their number is small, in almost every case there is at least one clinical detail which could be regarded as distinctly unusual in streptococcal rheumatism. Thus one child had a swollen ankle and knee for 9 days, which cleared up without salicylates and without other joints becoming involved. A boy had two attacks of "rheumatic fever" without much pain but with fever to 100° F for 2 or 3 weeks uninfluenced by aspirin. Another child, when only a year old, had an illness which from all accounts closely resembled rheumatic fever and was diagnosed as such, although rheumatic fever at that age is very rare. This illness settled down in 3 days without salicylates; and, although sulphadiazine was given, it does not follow that the drug exerted a curative effect. A fourth child had pericarditis with probably a large effusion but no endocarditis. In 2 of Findlay's cases pericarditis also developed without endocarditis, and in 1 of these a preceding attack of rheumatic fever lasted 7 weeks.

It would be unwise to dogmatise on so few cases, but the tentative conclusion may be drawn that instances of acute rheumatism presenting unusual features, such as mildness, undue persistence, or a disappointing response to salicylates, and of pericarditis without endocarditis, should bring to mind the possibility of underlying tuberculous infection.

Is it possible that the joint manifestations are due to infection of the joints by tubercle bacilli—in other words, is the condition that has been called tuberculous rheumatism no more than a variant of the familiar tuberculous arthritis? This seems unlikely, for tuberculous arthritis is not evanescent but most chronic and all too often leaves some permanent loss of function. Even if the arthritic symptoms in the above cases were shown to be associated with the presence of tubercle bacilli in the joints, it would be necessary to postulate some relationship between the host and the infective agent different from that encountered in tuberculous arthritis. To use the term tuberculous arthritis would give an entirely false picture of the clinical condition. No attempt was made in this series of cases to recover tubercle bacilli from the affected joints; but Nathan Raw (1914) described under tuberculous rheumatism a case in a girl, aged 19, with a long history of tuberculous cervical adenitis, who developed a secondary polyarthritis of rheumatoid type with rapid painless effusion into the joints of the wrists and fingers. Fluid from one wrist was aspirated and injected into a guineapig and a rabbit and gave rise to tuberculosis in both animals.

It remains to inquire whether modern theory about the pathogenesis of acute rheumatism can incorporate instances of tuberculous rheumatism.

The view that acute rheumatism is the result of hæmolytic streptococcal infection stands today without a serious rival, although the precise mechanism involved is as yet imperfectly understood. In his Mary Scott Newbold lecture, Coburn (1940) ably summarises our knowledge and concludes that heredity and environment in combination produce an individual who does not handle respiratory infections with hæmolytic streptococci in a normal manner, with the consequence that the immune response to the primary infection is inadequate. The formation of antibody is both delayed and prolonged, allowing the production of antigen to persist overlong. At the same time the storage of antibody within the cells of the reticulo-endothelial system places these in a state of sensitisation; the subsequent clash between freshly formed antigen and antibody within these cells evokes in the nearby tissues the inflammatory reaction characteristic of acute rheumatism.

If it is true that the patient with acute rheumatism has it because his immune mechanism is abnormal, the responsibility seems to lie with the host rather than with the infecting agent. That being so, it seems likely enough that the body should at times react in a rheumatic manner to other organisms besides the hæmolytic streptococcus. Coburn expresses it thus:

> "If the development of rheumatic fever is associated with an abnormal immune response of the host, we might expect to find comparable disease syndromes following other acute infections. Such a syndrome should not appear where there is an overwhelming virulent infection, nor in the highly immune host. It should be found among the intermediates. In our opinion comparable phenomena do occur in tuberculosis and syphilis."

With regard to congenital syphilis, joint changes comparable with those of rheumatoid arthritis are known to be a rare accompaniment, and Still (1924) mentioned having notes of 4 such cases. The instances of tuberculous rheumatism recorded here offer further support to the opinion expressed by Coburn.

REFERENCES

Bray, G. W. (1931) Recent Advances in Allergy, London, p. 393.
Coburn, A. F. (1940) *Trans. Stud. Coll. Phys. Philad.* 8, 91.
Findlay, L. (1920) *Glasg. med. J.* 93, 241.
Poncet, A., LeRiche, R. (1909) *Le rheumatisme tuberculeux*, Paris.
Raw, N. (1914) *Proc. R. Soc. Med.* 7, 68.
Still, G. F. (1924) Common Disorders and Diseases of Childhood, Oxford, p. 924.

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DIFFICULTIES IN THE DIAGNOSIS OF RHEUMATIC FEVER

H. STUART BARBER
M.D. Dubl., F.R.C.P.I.
WING-COMMANDER R.A.F.; OFFICER I/C A MEDICAL DIVISION

RHEUMATIC fever is usually easy to diagnose but sometimes presents less common characteristics which make its recognition correspondingly less simple. This happens particularly in the higher age-groups, and it is from experience in a Royal Air Force hospital that the cases here described are drawn.

That confusion in the diagnosis of rheumatic fever is fairly widespread is suggested by Ferguson's (1943) report on a series of 243 cases in the Canadian Army. These ran a course similar to that of acute rheumatism, but Ferguson maintains that, because there was no cardiac involvement or evidence of invasion of systems other than the joints, they should not be called rheumatic fever. He proposes instead "acute (febrile) polyarthritis." One cannot but deprecate this suggestion, since most of his cases presented all the features of rheumatic fever, and 71% reacted promptly to salicylates. Nor can there be agreement with his implied statement that a cardiac lesion is essential to the diagnosis. Confusion and multiplicity of nomenclature are the bane of chronic rheumatism, and it would be regrettable if a similar confusion was now to be introduced into acute rheumatism. Ferguson adds that 16 of the cases ended as rheumatoid arthritis.

Failure to make the correct diagnosis seems to be the result of two factors: (1) under Service conditions the disease is mostly encountered in the 3rd decade and later, when rheumatic fever presents a somewhat different appearance from that seen in younger patients; (2) Glover (1943) has shown that the incidence of rheumatic fever has constantly declined, and, coincidentally with scarlet fever, the disease may have become less severe.

Besides the usual differential points given for rheumatic fever in the textbooks, certain other conditions can cause confusion.

Poliomyelitis.—Poynton (1943) reminded us that arthritis could complicate acute anterior poliomyelitis, a fact to which Sir Thomas Barlow had drawn attention in 1881. This complication is described by Poynton as it was seen by him in a number of cases in 1942. The onset was painful, with swelling and redness affecting many joints. No increased local heat was noted. Sometimes the arthritis appeared before treatment was initiated, sometimes even after the most careful precautions had been taken. The arthritis tended to develop in those cases with the most severe and widespread paralysis, but this was not invariable. Poynton discusses the causation and excludes any therapeutic measures, such as the use of plastic splints, by the fact that joints became involved both before and after treatment. Finally he concludes that the arthritis is a manifestation of the virus infection. Until the paralysis appears, the difficulties in distinguishing this condition from rheumatic fever are obviously great, and as differential features he cites the cardiac lesions and the rapid rise of the erythrocyte sedimentation-rate (E.S.R.) in acute rheumatism as compared with poliomyelitis. Case 4, reported below, illustrates some of these difficulties.

Thrombophlebitis.—Poynton (1898) observed extensive venous thrombosis in 3 children with acute rheumatic fever. The possibility that such thrombosis is due to a failing rheumatic heart cannot finally be excluded, but the work of Perry et al. (1933) and more recently the observations of Russek and Abbott (1943) suggest that it is a direct involvement of the vessel walls. Russek and Abbott described a case of rheumatic fever in which thrombosis developed long after clinical evidence of active rheumatism had disappeared. The patient died of rheumatic heart-disease, and at the autopsy fibrosed Aschoff nodules were demonstrable in the walls of the affected vein. (Compare case 5 below.)

CLINICAL PICTURE

Rheumatic fever is an acute or subacute fever of unknown origin but apparently related closely to infections of the upper respiratory tract by the hæmolytic streptococcus. Bradley (1934) notes that precursory pharyngitis is an essential part of the rheumatic state and describes it as an acute and transitory disorder which precedes the rheumatic manifestations by 10–21 days. Yet it is remarkable how seldom inquiry into such a history is made or, if obtained, how often the implications are ignored. The principal signs during the rheumatic phase are inflammation of successive joints without gross or enduring deformity, fairly frequent but not invariable cardiac damage, pyrexia, and sweating. A raised E.S.R. and leucocyte-count are always present. The rapid alleviation of symptoms by the administration of salicylates is pathognomonic. A liability to recurrent attacks is considerable.

As seen in the R.A.F. the clinical features of rheumatic fever in some cases are as follows. Beginning with a monarticular swelling, usually of the knee, the onset in these cases seems to be particularly insidious and is not accompanied by severe constitutional symptoms. The diagnosis is often confused by the patient, who recollects some real or imaginary injury, usually trivial, to explain the swelling of the initially affected joint. This, although swollen, does not appear to be acutely inflamed and is seldom tender. There is limitation of movement, which produces pain. Constitutional signs, such as mild pyrexia and slight sweating, are usually found but are often insufficient to induce the patient to take to his bed of his own accord. The E.S.R. and leucocyte-counts are raised. A history of an upper respiratory infection preceding the onset by 2–3 weeks is not infrequent and helps to confirm the diagnosis, which if still doubtful should be clinched by the response to salicylates.

CASE-RECORDS

CASE 1.—Aged 26. On May 2, 1944, while sitting before the fire he noticed a stiffness in the right knee, which by next day had become swollen and difficult to move. He reported sick and was admitted to the station sick-quarters. There was some pyrexia, but the temperature was not noted on the case-sheet. After 2 days he had developed swelling of the right wrist and hand besides the knee. Sulphapyridine was prescribed and massage given to the affected joints. The left hand and wrist next became swollen, and on the 5th day salicylates were tried, with an immediate response. He was transferred to a Royal Air Force hospital on June 14. He was then convalescent, and his progress was uninterrupted. No cardiac lesion developed, and he was discharged to sick leave on July 19. When he was seen 3 months later, there had been no recurrence of the joint symptoms, and his general condition was satisfactory.

The insidious onset should be noted, but this ought not to have been so misleading, had the history of nasopharyngitis, for which he had received treatment at the sick-quarters 14 days before the onset of the joint symptoms, been seen in its right perspective. Despite the response to salicylates and the multiple involvement of joints a doubt regarding the diagnosis seems to have remained, for he was transferred to hospital with the diagnosis of internal derangement of the knee-joint.

CASE 2.—Aged 24. After a fall at physical training he was admitted to the station sick-quarters with a "sprained ankle" on July 20, 1944, and was detained for 4 days. On Aug. 4 he was referred to the orthopædic specialist with a note that there had been no improvement in the ankle and that he had also developed a swelling of the right knee and left wrist. As there was no definite history of trauma and the patient had a temperature of 100° F, he was admitted to the medical division. He responded well to salicylates, and the E.S.R. settled from 40 mm. to 7 mm. (Westergren) after 7 weeks. He was discharged to sick leave without any demonstrable cardiac lesion.

In this case the insidious onset and the history of a possible traumatic incident concealed the real condition.

CASE 3.—Aged 20. Admitted to hospital in August, 1944, with the history that 10 days earlier there had been a sudden onset of involuntary movements affecting mainly the right hand and arm. By next day the right leg was involved, and on admission there were jerky sometimes sinuous movements confined to the left side of the body. The neuropsychiatrist, under whose care he was admitted, could find no signs of organic disease in the central nervous system, and his mentality was classed as alert. Athetosis and hysteria were

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suggested as possible diagnoses, until painful swelling of the right knee and ankle developed. The E.S.R. at this time was 52 mm. per hr (Westergren). He was transferred to a medical ward, and further inquiry elicited that he had had vague aching in the joints for 3 months before the middle of June, when he had been admitted to the sick-quarters for 7 days with headache, pains in the limbs, and pyrexia. There was an immediate improvement in the joint symptoms after the administration of salicylates, but the chorea took rather longer. He was free from all symptoms on repatriation to Canada in November, and no cardiac lesion developed.

Had the history of the previous joint pains been forthcoming on admission, it is possible that the diagnosis would not have remained in doubt so long. Chorea is somewhat unusual in a man of his age.

CASE 4.—Aged 20. Admitted to a civil hospital on July 19, 1944, complaining of pain in both feet and across the back and chest. On admission the temperature was 100° F, and there was painful swelling of the right knee and ankle. The left knee and ankle, although not swollen, were also painful. Two days later he had some difficulty in passing urine and seemed rather drowsy. On the 28th he had no pain but complained of weakness in the arms. The weakness increased, and a physician who saw him then noted in his case-sheet "Large functional element—massage and exercises indicated." However, the weakness persisted, and the response to faradism of the right deltoid was poor. On Aug. 9 the E.S.R. was 15 mm. per hr (method not recorded). At this time a suspicion of poliomyelitis was aroused, but a lumbar puncture revealed no abnormality in the cerebrospinal fluid. Thereafter his condition improved, and he was transferred to a Royal Air Force hospital on Nov. 20 as a case of rheumatic fever. At this time he had wasting and loss of power in the right deltoid and both spinati. The remaining systems were normal. A soft basal systolic heart murmur was not considered significant. His progress continued to be satisfactory and when discharged on Jan. 23, 1945, he had almost regained full power in the affected muscles.

There seems to be little doubt that the condition was acute anterior poliomyelitis, but no exception can be taken to the original diagnosis of rheumatic fever. Arthritis is a rare complication of poliomyelitis, but the possibility of it deserves to be borne in mind.

CASE 5.—Aged 21. Admitted to the sick-quarters with a severe headache and a temperature of 101° F. The pyrexia persisted for 2 days. Seven days later he again became pyrexial, and then began to complain of pains in the shoulder and knees. There was no swelling of the joints; but, as the pyrexia persisted, he was transferred to a Royal Air Force hospital on Oct. 23, 1944, as a case of rheumatic fever. On admission the temperature was 100° F, and he complained of pain in the right leg and behind the right knee. There was no articular swelling, and movements of the affected limb were full and painless. Tenderness on palpation could be elicited over the inner aspect of the right thigh and in the right popliteal fossa. The E.S.R. was 12 mm. per hr (Westergren). The pain did not appear to have affected the joints at any time. By Nov. 9, as the E.S.R. was 4 mm. and he had been symptom-free, he was allowed up. The right leg became greatly swollen with pitting œdema. He was again confined to bed and after 10 days allowed up for very short periods at first. Slight swelling recurred, but the massive œdema of the first occasion did not reappear. The surgical specialist made a phlebogram, which did not demonstrate the presence of any deep veins, owing probably to their complete occlusion. The patient made a further recovery, but when seen again after a month's sick leave he was still having some œdema after standing for a time. He was invalided out of the service.

Rightly or wrongly this was regarded as a case of idiopathic thrombophlebitis, although the possibility of a preceding rheumatic fever cannot be excluded.

Two other cases admitted to hospital as rheumatic fever may be shortly described. The first had several painful swollen joints and an urticarial eruption on the trunk following an injection of antitetanic serum. The diagnosis was based on a soft systolic apical cardiac murmur. The patient clearly had serum sickness and made a rapid recovery. The other patient was admitted with an effusion into the right knee-joint. Further examination revealed an enlarged spleen and considerable leucopenia, and the serum agglutinated *Brucella abortus* to a pathognomonic titre. According to Hench et al. (1940), it has not been shown that the rheumatic symptoms in undulant fever are due to brucellosis, and they suggest that the relationship of rheumatism and brucellosis is coincidental. In these circumstances the original diagnosis was correct.

SUMMARY

Examples are given of confusion in the diagnosis of rheumatic fever.

The causes of this confusion may be (1) the age of the patients; (2) an alteration in the type of rheumatic fever; (3) poliomyelitis; (4) thrombophlebitis.

The diagnosis of rheumatic fever should be made in (1) precursory pharyngitis; (2) inflammation of successive joints without gross or enduring deformity; (3) pyrexia and sweating; (4) raised E.S.R. and leucocyte-count; (5) rapid alleviation of symptoms by treatment with salicylates.

The clinical picture is described of rheumatic fever as observed in a R.A.F. hospital, and 5 illustrative case-records are given, including one (case 3) in which there was a sudden onset of chorea in a man aged 20; one (case 4) of rheumatic fever complicated by acute anterior poliomyelitis; and one (case 5) in which the diagnosis lay between idiopathic thrombophlebitis and rheumatic fever.

REFERENCES

Bradley, W. H. (1934) *Acta rheum., Amst.* **23**, 25.
Ferguson, G. C. (1943) *Canad. med. Ass. J.* **49**, 492.
Glover, J. A. (1943) *Lancet*, ii, 51.
Hench, P. S., Bauer, W., Dawson, N. H., Hall, F., Holbrook, W. P., Key, J. A., McEwen, C. (1940) *Ann. intern. Med.* **13**, 1708.
Perry, C. B., Davis, O. C. M., Schlesinger, B. (1933) *Ibid*, ii, 966.
Poynton, F. J. (1898) *Ibid*, ii, 206; (1943) *Ibid*, ii, 433.
Russek, H. I., Abbott, G. A. (1943) *Amer. Heart J.* **26**, 542.

CONTINUOUS EPITHELISATION ON LARGE DENUDED AREAS

J. EASTMAN SHEEHAN
M.D. Yale, F.A.C.S.
PROFESSOR OF PLASTIC REPARATIVE SURGERY, NEW YORK POLYCLINIC MEDICAL SCHOOL

JOHN JENNEY
M.D. St. Louis
ASSISTANT PROFESSOR OF PLASTIC REPARATIVE SURGERY AT THE SCHOOL

THE provision of an early skin covering for large wounds by the usual methods of grafting entails extensive denudation and scarring elsewhere on the body. The following procedure accomplishes this purpose with great economy in grafted skin. It is not suitable for the face or other exposed parts since the cosmetic result is not good; but on concealed areas it furnishes a quick, economical covering. Moreover, it preserves function by allowing early active motion of the affected parts.

TECHNIQUE

After cleansing the surrounding skin with 'Cetavlon,' the granulations are vigorously rubbed with a silver nitrate pencil and the resulting "weeping" allowed to dry. Compresses of normal salt solution are applied, producing a chemical reaction which causes the granulations to become elevated, hard, and bluish grey. A sharp line of demarcation forms between granulations and normal skin; and the granulations are then excised without scraping. The granulations roll off in large sheets, leaving a healthy, sterile base. Dry gauze is applied under some pressure to control the slight oozing which ensues; it is lifted several times during the operation to prevent adherence to the wound.

An intermediate graft is then removed with the dermatome, which has been previously prepared as in the plasma fixation of grafts.[1] The graft may be 8 in. by 6 in. or even less, in remarkable contrast to the size of the area to be covered. It is removed from the dermatome attached to a sheet of rubberised tulle.

The skin bordering the defect is coated with rubberised cement to hold the overlapping ends of tulle when the graft is applied. The raw surface of the graft is painted with white-cell extract prepared from the patient's blood immediately before the operation, and the recipient area receives a coating of the patient's own plasma.[1] Purified thrombin may be used instead of the

1. Sheehan, J. E. *Lancet*, 1944, ii, 363.

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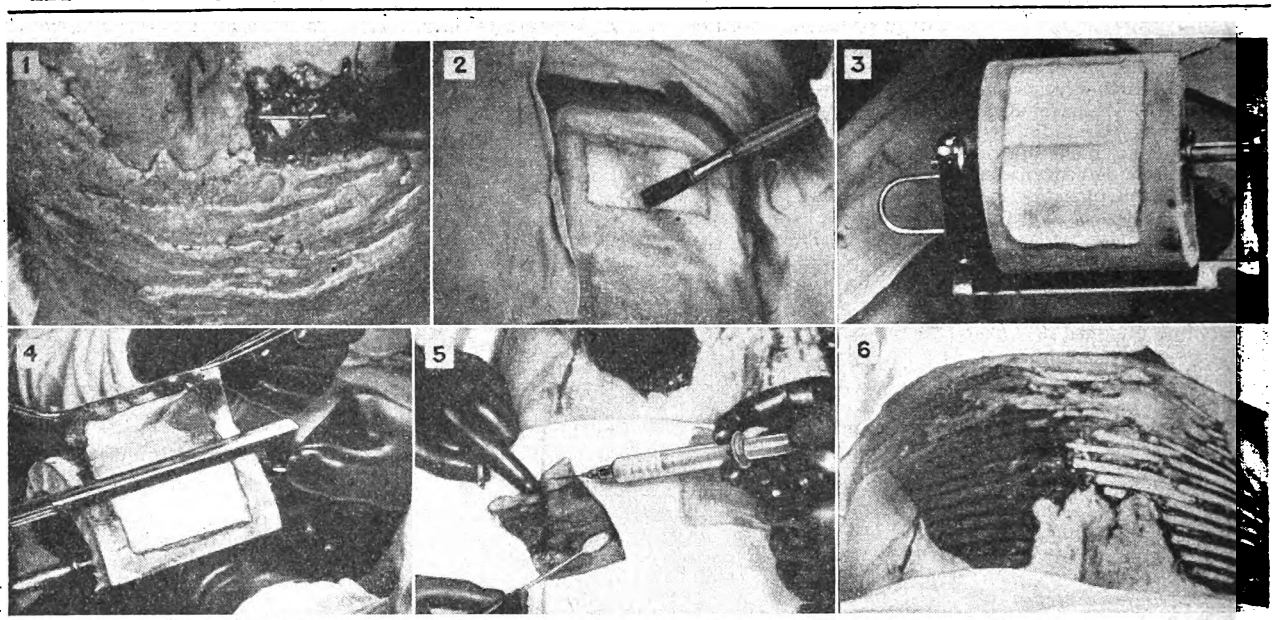

Fig. 1—Large granulating area. Note the exuberant infected state of the granulations.

Fig. 2—Donor area marked out and smeared with glue.

Fig. 3—Portion of intermediate skin removed with dermatome.

Fig. 4—Splitting the skin before its removal from dermatome.

Fig. 5—Raw areas smeared with white-corpuscle extract.

Fig. 6—Method of applying skin with tulle. *Note*: So much can be covered with so little.

white-cell extract but it does not produce as rapid or certain fixation. The graft is then cut into strips 8–10 mm. wide; and these strips, held in artery forceps for ease in application, are placed on the defect at intervals, a space about its own width being left between each strip and its neighbour. The tulle ends on the strips of skin adhere to the cement-coated skin surrounding the recipient area, anchoring the grafts in place. Penicillin and a sulphonamide are administered parenterally; and penicillin solution may be sprayed on the wound for its drying as well as its bacteriostatic effect. A dressing of gauze impregnated with soft paraffin is applied under slight pressure and the area bandaged.

The aim of the procedure is that epithelisation occurring at the edges of the skin strips shall fill in the spaces between them. If the gaps are not wholly covered by this process, the procedure is repeated after a week or so—the tulle on the successfully grafted strips is removed with sulphuric ether; granulations are treated with silver nitrate and salt solution and excised; another small intermediate graft is taken, painted with white-cell extract and cut into strips; and the strips are applied to the plasma-coated raw surfaces, as already described. After application of penicillin and gauze impregnated with soft paraffin, the wound is again bandaged.

ALTERNATIVE TECHNIQUE

When the space to be covered is very great, further economy in grafted skin can be effected by the following method. Granulations (fig. 1) are treated with the silver nitrate pencil and salt solution, and are excised, and an intermediate skin-graft is taken (figs. 2 and 3). At this point the procedure diverges. A sheet of dry tulle is placed over the raw surface of the graft, which has been previously moistened with plasma, and the tulle is covered with the patient's own blood, or with bloody serum from the wound if this is present in sufficient quantity. The knife of the dermatome is then reset so as to divide the graft in two throughout its thickness (fig. 4). The split-off portion, which has two raw surfaces, adheres to the tulle, to which bloody serum has been applied; the portion adhering to the original rubberised tulle on the dermatome has only one raw surface. This splitting of the graft is easily accomplished and doubles the amount of skin available.

The exposed surfaces of both skin fragments are painted with white-cell extract (fig. 5) and cut into strips. The defect is covered with plasma and the strips are laid on it (fig. 6). It is important to note that thrombin cannot be used instead of white-cell extract on the split-off portion; the plasma-leucocyte combination appears to be essential to the organisation of this graft.

To ensure fixation, a coating of plasma-white-cell mixture is applied to the area. When it is dry a piece of gauze damped with the mixture is put on the wound and allowed to dry. This is then smeared with 10–20 c.cm. of blood removed from the patient's vein, and the wound is bandaged.

CONCLUSIONS

The procedure of continuous epithelisation, using strips of skin with gaps between them, provides a quick covering for large denuded areas with remarkable economy in grafted skin.

Splitting the graft in two throughout its thickness halves the amount of skin which need be taken.

While this procedure is not suitable for use on exposed areas because of the imperfect cosmetic result obtained, it is valuable when a quick extensive covering is required on a concealed part of the body.

It reduces the period in hospital and conduces to normal function by restoring the affected parts to early active use.

ERYSIPELOID

S. SINGER
M.D. Vienna
RESIDENT MEDICAL OFFICER, WIMBLEDON HOSPITAL

ATTENTION is here called to a somewhat rare condition of the skin which seems to be more common in Great Britain than is generally realised. The incidence is greater in rural than in urban districts. It resembles a mild erysipelas, is found mostly on the fingers or forearms of butchers, and is acquired through handling living or dead pigs.

The mode of infection is through a superficial and probably unnoticed abrasion of the skin. After a short incubation period, usually 1–2 days, local swelling and reddening develop, the affected areas usually being one or several fingers. There is a tendency to spread, but the demarcation line is not so obvious as in erysipelas. There is no hard infiltration of the skin, although it looks tense and shiny. The patient does not feel ill. There is no pain, only some discomfort from the tension and a feeling of heat in the affected part. A rise of temperature is unusual, and there is no enlargement of the neighbouring lymph-glands. Pus formation is extremely rare, and I have never found surgical interference necessary. The patient, however, is worried

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about his condition and thinks he is suffering from "blood poisoning."

Treatment consists of giving specific or non-specific serum. The former is a swine-erysipelas serum specially made up for use in man; the latter ordinary normal horse-serum. These sera are injected intramuscularly, the dose being 10 c.cm. Local application of 20% ichthyol ointment seems to be useful; so does ultra-violet radiation. This was the approved and successful treatment 15–20 years ago, and it has to be seen whether or not one of the modern drugs, particularly the sulphonamides, will prove more effective.

I have seen 2 cases during the last 12 months at the Wimbledon Hospital.

CASE 1.—A butcher's assistant with symptoms as described above on his right index finger. He attended only once at the hospital and had apparently a quick and satisfactory result from the ichthyol application prescribed.

CASE 2.—A man, aged 39, a member of a pig-club, was admitted to the hospital two days after he had handled a killed pig. He thought he had injured himself slightly during this work, but no injury was found, though a slight abrasion may have been present. A typical erysipeloid appeared on the 2nd and 3rd fingers of the right hand. The temperature remained normal, except for a slight rise to 99° F on the 4th day after admission. There was no pain or malaise. The lesion was first thought to be septic, so antitetanus and antigas-gangrene sera and sulphapyridine were ordered. The skin changes gradually disappeared after sulphapyridine 1 g. 4-hourly had been given for 4 days, but they recurred and even spread when the drug was discontinued. The diseased skin area was now irradiated with artificial sunlight. Unfortunately sulphapyridine was given again as a safeguard, and there is therefore no proof of which particular treatment was responsible for the final healing which took place in a few more days—if, indeed, any was effective. Judging by my former experience I think that irradiation alone or combined with ichthyol treatment would have had the same effect, although the lesion certainly seemed to be influenced favourably by the sulphapyridine.

There is no danger of infection from man to man, as in true erysipelas, since the virulence of the germ for man seems to be greatly weakened by its initial passage from pig to man.

This uncommon condition, which is hardly mentioned in standard textbooks on skin diseases, is caused by *Bacillus rhusiopathiæ*. Mackie and McCartney[1] say that "cases of human infection (erysipeloid) by this organism, *B. rhusiopathiæ* or *Erysipelothrix rhusiopathiæ*, have been recorded. This is usually contracted through abrasions of the skin when infected carcases are handled—e.g., by abattoir workers. The lesion is situated on the hand or forearm. *B. rhusiopathiæ* may occur in apparently healthy pigs and has been isolated from the tonsils, intestines, and fæces."

For bacteriological proof that a human lesion is caused by this organism attempts to cultivate it artificially should be made. It grows well on ordinary media, but, being micro-aerophilic, preferably as a stab culture on gelatin or agar. A delicate growth will follow the needle-track with small lateral radiations. The organism is a slender non-motile gram-positive rod which may be seen in short chains or filamentous forms showing a tendency to branch. Mice and pigeons are particularly susceptible to infection by inoculation of cultures or material obtained directly from a lesion. These animals develop an acute septicæmia within a few days of inoculation, and the organism may be recovered from the blood.

I am much indebted to Dr. F. A. Knott and Prof. F. Silberstein for their advice.

1. Mackie, T. J., McCartney, J. E. Handbook of Practical Bacteriology, Edinburgh, 1942.

FILM ON JAW INJURIES.—"The Treatment of Jaw Injuries in the Field," a film made during the battle for the crossing of the Rhine, shows the front-line treatment given to a number of facio-maxillary injuries by the forward dental officer and his colleagues. It is a splendid record which does credit to the Army Dental Corps and the Army Kinematograph Service alike. Running-time, 65 minutes.

ERYSIPELOID OF ROSENBACH

RESPONSE TO PENICILLIN

MARY BARBER, M.D. Lond.
MAURICE NELLEN, M.R.C.P.
M. ZOOB, M.B. Lond.

From the Departments of Medicine and Pathology, British Postgraduate Medical School

HUMAN infection with *Erysipelothrix rhusiopathiæ*, the organism of swine erysipelas, is sufficiently uncommon for any proved case to be worth recording. Recently 7 cases clinically diagnosed as erysipeloid of Rosenbach have been admitted to this hospital, and in 5 of them the diagnosis has been bacteriologically confirmed. These cases are we believe the first human cases to be treated with penicillin, although Heilman and Herrell (1944) have successfully treated experimental erysipelothrix infection in mice with penicillin.

CASE-RECORDS

The first case of the series is described in detail and the 4 other bacteriologically confirmed cases are briefly summarised.

CASE 1.—A butcher, aged 16, was admitted to Hammersmith Hospital on July 6, 1945, for intractable headache and general malaise. On the previous day he had punctured the hypothenar eminence of his right hand with a bone splinter while handling beef. That night he could not sleep because of pain in the hand. Next day he developed a violent frontal headache and pain between the shoulder-blades. He felt ill and unable to work and was admitted to hospital.

There was no illness of note in his previous history. On admission his temperature was 100° F. He was pale and had well-marked photophobia. There was no neck-rigidity, and Kernig's sign was negative. Over the chest and back there were numerous brown macules of pityriasis versicolor. Heart, lungs, abdomen, and central nervous system presented no abnormalities. There was a small puncture wound on the hypothenar eminence of the right hand, and from this bright-red streaks of lymphangitis extended to a tender lymph-gland halfway up the biceps. The lymphangitis seemed inadequate to explain the severe malaise, headache unrelieved by 'Veganin,' and intense photophobia.

A blood-culture was taken within a few hours of admission but remained sterile after 14 days' incubation. The cerebrospinal fluid was normal as regards cells and chemistry. A blood-count showed Hb 96%; red cells 5,700,000 per c.cm.; white cells 7000 per c.mm. (polymorphs 54%, lymphocytes 44%, monocytes 1%, plasma cells 1%). No swab could be taken from the puncture wound because the surface breach of skin was almost imperceptible. The patient was treated for (?) infective lymphangitis with 'Sulphamezathine' (I.C.I.) 2 g., followed by 1 g. 4-hourly, and kaolin poultices to the puncture wound.

Next day he was much improved, fever, headache, and lymphangitis having disappeared. The following day (July 8), though he was still afebrile, violent intractable headache returned, and persisted for 36 hours before disappearing several hours before sulphamezathine was discontinued. After the disappearance of headache on July 10, 4 days after the onset of the disease, there was no further evidence of constitutional disturbance.

On July 11 the erysipeloid appeared close to the original puncture as a small patch of vivid purplish-red erythema with a slightly raised edge. Next day the lesion had extended to form a complete band encircling the original wound and spreading on to the dorsum of the hand (fig. 1). The reddened area was only slightly tender on pressure, but the patient complained of a burning itching sensation similar to that produced by a chilblain. This circular band of erythema advanced progressively as the central area faded.

Cultures were made from a biopsy specimen taken from the spreading edge; and, pending isolation of the organism, a further course of sulphamezathine was given empirically but without effect.

On the 19th erysipelothrix was isolated and shown to be penicillin-sensitive. The patient was then started on penicillin 20,000 units intramuscularly 3-hourly. Next day there was no striking change. On the 21st, however, the band of erythema had completely vanished, leaving the hand only

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very slightly darker in colour than its fellow. Penicillin was continued for a further 24 hours, and the patient was discharged 3 days later; 14 days later he reported no recurrence, and the hand was desquamating extensively.

Bacteriological Report.—A biopsy specimen from the edge of the lesion was sent for bacteriological examination. Part of it was cultured on blood-agar plates aerobically and anaerobically, and a piece of skin was put into a tube of glucose broth. The blood-agar plates remained sterile after incubation, but a slender pleomorphic gram-positive bacillus appeared in the glucose broth (fig. 2). Fig. 3 shows typical colonies after subculture on to a nutrient agar plate, which was then incubated for 24 hours. The culture was mixed with *Staphylococcus aureus* for comparison. The colonies were from 0·1 to 0·2 mm. in diameter, smooth, circular, with an entire edge, and completely transparent. The addition of blood did not apparently improve growth; the colonies remained small, but a slight ring of partial hæmolysis developed round them.

Two mice were injected intraperitoneally with 0·25 ml. of a broth culture. Both died, and post mortem small abscesses were found in the liver similar to those described by Barber (1939) in erysipelothrix infection of these animals.

The diagnosis of the organism was confirmed by the fact that it was agglutinated by a serum prepared against a known strain of *E. rhusiopathiæ*. A sample of serum taken from the patient did not show any agglutination either with the autogenous organism or with a stock culture of *E. rhusiopathiæ* obtained from the National Collection of Type Cultures. The organism here described was found to have a sensitivity to penicillin about equal to that of the Oxford staphylococcus.

CASES 2 (butcher's assistant) AND 3 (cook) were admitted 12 and 22 days respectively after injury and were already recovering. They were therefore not actively treated. In both cases the infection was derived from pricks from rabbit bones. In each case erysipelothrix was isolated from a skin biopsy taken from the edge of the lesion. Both strains of erysipelothrix had a sensitivity to penicillin approximately equal to that of the Oxford staphylococcus.

CASE 4.—A housewife was admitted 3 days after the appearance of the erysipeloid on the terminal portion of the thumb. There were headache and nausea at the onset. No injury was recollected. When first seen there were lymphangitis and axillary lymphadenitis and temperature 99° F. On the 5th day of disease there was a typical well-demarcated patch of erysipeloid on the medial aspect of the upper arm. Thereafter both lesions spread progressively. On the 8th day a biopsy was taken from which erysipelothrix was isolated and penicillin treatment was started; 27 hours later both lesions had faded and in 48 hours both had disappeared. Slight desquamation followed. The organism once again was found to be penicillin-sensitive.

CASE 5.—A butcher's assistant was seen 7 days after injuring his thumb with a knife while cutting calves' liver. A painful swelling first made its appearance 2 days after the injury. On admission a typical erysipeloid lesion was present over the proximal end of the thumb and the thenar eminence. On the day of admission (6th day of disease) a biopsy was taken. Next day erysipelothrix was reported present and penicillin treatment started; 48 hours later the lesion had disappeared.

Fig. 1—Erysipeloid of Rosenbach on dorsum of hand. Initial wound was a prick on the hypothenar eminence from a bone splinter.

DISCUSSION

These cases appear to have been typical examples of the lesion described by Rosenbach (1884), and called by him erysipeloid. The original description of this disease is said to be by Fox (1873), who described a lesion on the hand of a man who tried on boots made of sheepskin. Baker (1873) described 5 cases of a similar lesion, which he called erythema serpens.

Klauder (1938), reviewing 100 cases, found that 58% arose in abattoir workers and 11% in persons handling fish in the retail trade. The usual incubation period was 1–3 days. Pain at the site of injury was a constant feature. The lesion was typically a sharply defined elevated zone of purplish-red erythema extending peripherally as the central area faded. It was commonly accompanied by lymphangitis and in 6% of cases by constitutional disturbances with fever up to 100°–102° F. The disease was self-limited, lasting 10–30 days in 79% of cases. Septicæmia, with positive blood-culture, was very rare but did develop occasionally. The course of the disease could be shortened by serum, though serum-sickness was often more incapacitating than the disease, and it was not recommended as routine treatment. Dumont and Cotoni (1921) described a case of meningitis in which the organism was recovered from the cerebrospinal fluid. Fatal infections with septicæmia and endocarditis have been described by Russell and Lamb (1940) and Klauder and others (1943).

In the small series here described, 3 of the patients were butchers, and of the 2 others 1 was a cook and 1 a housewife. The incubation period was from 1 to 6 days, the latter being unusually long. Desquamation which was shown by 3 of the cases is also apparently exceptional. Otherwise the cases conform closely to the original description and 2 of the 3 cases seen early showed a typical constitutional disturbance. The response of lymphangitis in case 1 to sulphamezathine suggests that some other organism was responsible, as the erysipeloid itself was so strikingly unaffected by sulphamezathine. Insensitivity of this condition to sulphonamide therapy has been reported by others (Klauder et al. 1943, Klauder and Rule 1944). The disease lasts from 5 days to 2 months or longer, and usually subsides spontaneously even if not treated. Cases 2 and 3 in this series illustrate this. The duration of cases 1, 4, and 5—from 9 to 11 days—falls within the described period of self-limitation of the disease, but the response to penicillin was so abrupt that it strongly suggests that the treatment was effective, especially as all the strains of erysipelothrix isolated were sensitive to penicillin in vitro.

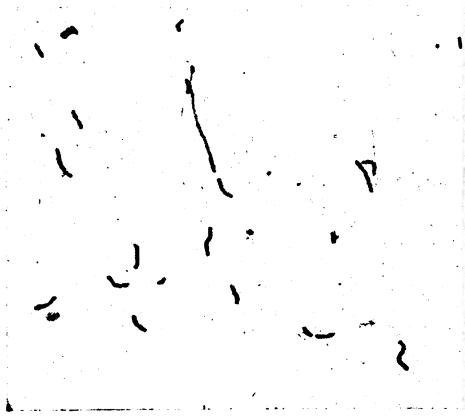

Fig. 2—Pleomorphic gram-positive bacilli, grown in glucose broth after 24 hours at 37° C, from biopsy specimen of skin taken from the edge of the erysipeloid lesion in case 1. (× 900.)

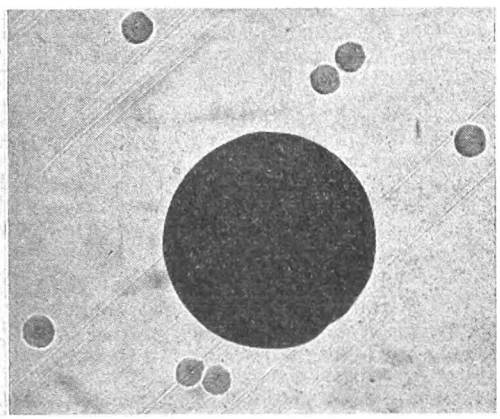

Fig. 3—Colonies of same bacilli as shown in fig. 2 after subculture on nutrient agar incubated 24 hours at 37° C. The much larger colony is of *Staph. aureus* for comparison. (× 25.)

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At first sight it appears surprising that we should see 7 cases of a somewhat rare condition in a few months. All but one are known to have resulted from wounds obtained while handling beef or rabbit, but there is no connexion between any of them. There are, however, two factors which might help to explain the series. First, the condition is probably not as rare as is supposed. Bacteriological confirmation is only possible from a biopsy and even then it is not easy. In none of these cases was erysipelothrix isolated by direct plating of the biopsy material, whether the plates were incubated aerobically, anaerobically, or in an atmosphere containing 10% CO_2; but only after immersing a piece of skin in glucose broth and incubating for 24 hours. In 2 of 7 clinically similar cases the organism was not isolated even by this means. After establishing the diagnosis in case 1, a watch was kept in the casualty department for similar lesions. Cases 2 and 3 would almost certainly have been missed had this not been done. Secondly, erysipelothrix infection is widespread in the animal kingdom, and it is possible that meat which in times of plenty would have been condemned is now being passed as fit for human consumption.

SUMMARY

Five bacteriologically confirmed cases of erysipeloid of Rosenbach are described; 3 were treated with penicillin intramuscularly, which appeared to effect a complete recovery in 48 hours. These 5 cases and 2 other clinically similar ones were all admitted to this hospital in a space of 4 months.

Our thanks are due to Dr. R. T. Brain, who was responsible for the original diagnosis in case 1.

REFERENCES

Baker, W. M. (1873) *St Bart's Hosp. Rep.* 9, 198.
Barber, M. (1939) *J. Path. Bact.* 48, 11.
Dumont, J. A., Cotoni, L. (1921) *Ann. Inst. Pasteur*, 35, 625.
Fox, W. T. (1873) Skin Diseases, London, p. 108.
Heilman, F. R., Herrell, W. E. (1944) *Proc. Mayo Clin.* 19, 340.
Klauder, J. V. (1938) *J. Amer. med. Ass.* 111, 1345.
— Kramer, D. W., Nicholas, L. N. (1943) *Ibid*, 122, 938.
— Rule, A. M. (1944) *Arch. Derm. Syph.* 49, 27.
Rosenbach, A. J. F. (1884) Mikroorganismen bei den Wundinfektionskrankheiten des Menschen, Wiesbaden.
Russell, W. O., Lamb, M. E. (1940) *J. Amer. med. Ass.* 114, 1045.

NON-GREASY JELLY BASE FOR PENICILLIN

J. SPENCER, M.R.C.S., D.P.H., PATHOLOGIST
E. J. BISHOP, A.I.M.L.T., CHIEF LABORATORY TECHNICIAN
A. RICKS, DISPENSER
SEAMEN'S HOSPITAL, TILBURY, ESSEX

FOR the best results in the treatment of superficial lesions and skin eruptions with penicillin continuous application in effective concentration is essential. For this purpose special bases have been devised.

Two years ago Clark et al. (1943) used a cream made up with 'Lanette Wax SX' and castor oil (at first cod-liver oil), for burns infected with hæmolytic streptococci. This cream was for some time a routine preparation; it was also used for various lesions by Barron et al. (1944) in their investigations for the Medical Research Council.

Coles et al. (1945) adopted 0·5% agar as a medium for penicillin and used it, under the name 'Penagar,' as a non-greasy semi-solid preparation for local application in skin infections and infected superficial wounds, and for intramuscular injection in gonorrhœa. It appears to have advantages over lanette wax by reason of its consistence.

Grossmark and Plewes (1945) used penicillin in 'Eucerin LM,' and alcoholic lanolin base, and found that the penicillin kept its potency longer in this base than in lanette wax but did not state how long. Soft-paraffin and stearate bases have also been used as media for the application of penicillin. Solutions of penicillin in these bases have some advantages but owing to their consistence application is limited, and the diffusion of penicillin through the media is variable. Selbie et al. (1945) have shown that ointments and greasy creams do not allow good diffusion of penicillin and are easily contaminated. Greasy creams are also unsuitable for application to lesions of the acne type (Roxburgh et al. 1944). We thought that there was still a need for a suitable non-greasy medium in which penicillin could be incorporated, through which it diffused evenly and readily, and in which it kept its potency for a long time.

The medium described below was therefore compounded and used clinically. The advantages claimed for it are that it infiltrates damaged or diseased tissue more readily and easily than the preparations mentioned above; its contents are readily and cheaply obtained; the presence of glycerin is an advantage, since glycerin is an emollient and its hygroscopic property is useful for its dehydrating effect in inflammatory conditions; it also increases the penetrative action of any drugs held in solution. The jelly is easily manipulated; it can be poured, spread, and applied by other simple means to skin lesions, superficial wounds, sinuses, or open cavities.

PREPARATION

Constituents.—

Powdered tragacanth No. 1 (No. 140 powder B.D.H.)	8 g.
Glycerin (B.P.)	110 c.cm.
0·25% 'Nipagin M' * in distilled water	332 c.cm.

Penicillin, 250,000 Oxford units, in sufficient sterile distilled water (about 25 c.cm.) to produce a total weight of 500 g. (500 Oxford units per 1 g.)

The following items will be required:

2-lb. glass preserving-jar.
250 c.cm. glass measure.
500 c.cm. glass measure.
Stainless-steel spatula with 6-in. blade.
Glass pestle and mortar.
Sterile 2-oz. Waterford jars.

Method.—Weigh the 2-lb. glass jar. Place the tragacanth powder in a dry mortar, add the glycerin slowly, stirring for a few minutes. Pour the mixture slowly into the 2-lb. jar containing 332 c.cm. of nipagin M 0·25% solution and stir with a spatula. Partly screw on the lid, place in autoclave, raise temperature to boiling-point, and allow to steam with cover on autoclave (but not screwed down) for 15 min. Raise cover of autoclave and rapidly screw lid of jar down tight and autoclave at 10-lb. pressure for 30 min. Allow autoclave to cool down before removing jar.

When the jelly is cold, add the penicillin dissolved in sterile distilled water to produce 500 g. of penicillin jelly, stir thoroughly with a sterile spatula but gently to avoid bubbles. Transfer the penicillin jelly into the sterile Waterford jars, taking every precaution against airborne contamination. The labels should show the strength of the penicillin jelly and the expiry date—i.e., a month from date of manufacture. To ensure full potency during this period, the penicillin jelly must be stored in a refrigerator. The consistence of the jelly base can be adjusted by increasing or decreasing the tragacanth content.

TESTS OF POTENCY IN VITRO

Samples of penicillin jelly were tested for potency and stability. To determine the stability, portions of each sample were stored at room temperature and in the refrigerator. The tests for potency were made against the standard Oxford *Staph. pyogencs* H strain.

Deep nutrient agar plates were prepared and, when set, allowed to dry off in the incubator at 37° C for 20 min. These were then seeded over the whole surface to obtain a confluent growth, with a throat-swab moistened with an emulsion of a fresh subculture of *Staph. pyogenes* H in nutrient broth.

Minute portions of penicillin jelly were then applied to the centres of the plates with an ordinary platinum-wire loop. The loop was flamed, cooled, and inserted into the jelly to a depth of about 2 cm. It was then thrust at right angles to the plate until the point touched the underside of the petri dish, rotated once or twice, withdrawn, and flamed. A separate dish was used for each sample under test. The dishes were incubated at 37° C and the results recorded after

* Nipagin M is a methyl ester of *p*-hydroxybenzoic acid. It is a white crystalline powder and is used as a preservative to prevent growth of micro-organisms and decomposition in pharmaceutical and analytical reagents in a concentration of 0·05–0·2%. It is slightly soluble in water (1 in 400) and readily soluble in oils and glycerin. We have incorporated this in our base as an additional preservative against contaminant organisms. Nipagin M is a product of the Nipa Laboratories Ltd. and can be obtained through Messrs. P. Samuelson & Co., 17, Creechurch Lane, London, EC3.

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12 hours, the area of inhibition surrounding the jelly being measured in cm.

All freshly prepared samples of jelly tested in this manner produced an area of inhibition surrounding the jelly 2·5 cm. in diameter. Repeated tests were made at intervals to determine the stability. The accompanying table shows that the penicillin jelly remained stable for 4 weeks provided it was stored in a refrigerator. At room temperature almost half the potency was lost in 14 days, and no activity could be demonstrated after 27 days.

DIAMETERS OF AREAS OF INHIBITION

Day	1st	6th	10th	14th	19th	23rd	27th	31st
Diameter in cm.: Room temperature	2·5	2·0	1·5	1·5	1·0	0·4	0·0	..
Refrigerator ..	2·5	2·5	2·25	2·5	2·2	2·4	2·3	1·7

CLINICAL USES

Various complaints have been effectively treated, including skin affections such as impetigo, secondarily infected eczema, and staphylococcal pustular eruptions. Residual chronically discharging sinuses in osteomyelitis and ulcers following wounds and operation incisions have responded well. Old varicose ulcerations improved remarkably. Prophylactic dressing of burns with penicillin jelly has become a routine and proved useful both as an emollient and as an antiseptic.

SUMMARY

A new method of incorporating penicillin in a non-greasy jelly compound is described. The results obtained with the jelly in this hospital seem to warrant extended clinical trial.

We wish to thank the medical and surgical staffs of the hospital for their coöperation in clinical trials.

REFERENCES

Barron, J. N., Christie, R. V., Fraser, D. B., Garrod, L. P., Mansfield, O. T., Morgan, H. V., Mowlem, R., Robertson, I. M., Roxburgh, A. C., Roxburgh, I. A. (1944) *Brit. med. J.* i, 513.
Clark, A. M., Colebrook, L., Gibson, T., Thomson, M. L., Foster, A. (1943) *Lancet*, i, 605.
Coles, R. B., Barker, A. N., Robertson, E. A., Cowan, S. T. (1945) *Ibid*, i, 720.
Grossmark, G. J., Plewes, L. W. (1945) *Brit. med. J.* i, 906.
Roxburgh, I. A., Christie, R. V., Roxburgh, A. C. (1944) *Ibid*, i, 524.
Selbie, F. R., Simon, R. D., McIntosh, J. (1945) *J. Path. Bact.* 57, 47.

FAMILY WELFARE ASSOCIATION

ON Feb. 1 the Charity Organisation Society is to change the name it has carried for 76 years. The thought of organised charity is nowadays unpleasing, with its faint aroma of Bumble and self-righteous guardians of the poor; and the new name of the Family Welfare Association will give a fairer idea of the work this body is doing and has done for so long. The change will certainly not mean a falling off in the society's work, which is considerable. In the London area, assisted by 25 district committees, it deals with an average of 15,000 cases a year, giving special attention to family difficulties. Its aim is always to remove the causes of distress, not merely to relieve the immediate need. An inquiry bureau in the Vauxhall Bridge Road answers more than 20,000 questions yearly from other organisations and from people engaged in relief work. The society publishes the *Annual Charities Register and Digest*, which contains details of some 4000 reputable charitable organisations. As a contribution to the war it conducted 45 citizens' advice bureaus in London, giving help to more than a million people; it also administered the British War Relief Fund of the U.S.A. and raised and administered the Civilian War Distress Fund. The society has proved a useful protector to people with soft hearts against appeals for help on their doorsteps; an offer to provide assistance through the Charity Organisation Society often serves as a touchstone to distinguish the deserving case from the confidence man. For the public welfare it has done much, assisting Royal Commissions and Government departments on many occasions and fostering important social legislation, including the Artisans Dwelling Act of 1875, the Registration of Charities Act of 1940, and the Moneylenders and Hire Purchase Acts. Under its new and better name it will be able to carry its growing services into the constructive future which lies before us.

Medical Societies

ROYAL SOCIETY OF MEDICINE

AT a meeting of the section of surgery on Jan. 2, with Prof. ERNEST FINCH in the chair, a discussion on

Abdominal Incisions

was opened by Sir HENEAGE OGILVIE, who pointed out that the views which a surgeon has built up on the sound foundations of lessons learnt from failures and assurance brought by success are not easily changed. An abdominal incision, he said, is like a house, a wife, a motor-car, or a fountain-pen—when we have one that suits us and works well, we stick to it, even though there may be better ones on the market. The abdominal incision should provide adequate access for the job; it should be extensible, within reason; and it should interfere as little as possible with the immediate postoperative phase, and leave a strong abdominal wall. The generous incision, while allowing reasonable latitude, should not be expected to cover a multitude of wrong diagnoses. The incision should be large enough to allow the surgeon to work with his fingers and not only with instruments, for the surgeon's fingers are the gentlest and safest of tools. A small incision is the vice of the callow, the cosmetic, and the commercial; it means at best more retraction and trauma than is really necessary, at worst a job poorly done, or a necessary job left undone. That does not imply that it is justifiable to open the abdomen with a wound like a yawning hippopotamus. In emergencies the surgeon should follow the two simple rules that enable bookmakers to live in Park Lane and spend their weekends at Brighton: Bet on probabilities and cut your losses. In the acute abdominal stakes the appendix is odds-on favourite, so when in doubt make an appendix incision. The surgeon will establish the diagnosis by the fluid that escapes and by gentle exploration with a finger, and he can then close the appendix incision and perform the necessary operation through the correct one, having wasted less time and done less damage than if he had started with some compromise incision. Paramedian, midline, and transverse incisions all permit the fullest extension. The transverse incision above the umbilicus is cramped by the narrow epigastric angle. The linea semilunaris incision divides nerves and cannot be countenanced. Adhesions to the deeper surface of the wound are always a hazard; adhesions to the colon are relatively harmless, but those contiguous to the small intestine, in the umbilical and hypogastric regions, carry the added risk of small-intestine obstruction. It is often forgotten that the abdominal wall is a prime factor in the maintenance of life and the preservation of health; abdominal pressure holds the viscera in place and opposes the efforts of gravity to crowd the organs into the pelvis; in respiration the abdominal wall is the "recoil mechanism of the diaphragm"; it is the venous heart of the circulation. The lateral group of muscles are inserted via the rectus sheaths into the linea alba, and thus impose a transverse strain on the abdominal wall. The rectus sheath has a spatial but not a functional relationship to the rectus muscle. Intra-abdominal tension can be high—as in rowing—and yet the recti be completely relaxed. They are out of action in sitting or lying with hip or trunk flexed, but serve in locomotion. The lateral muscles are the maintainers of abdominal pressure and emptiers of the lung. Transverse incisions of the lateral abdominal wall and rectus sheath are thus physiologically sound, for they do not lead to interference with respiration and the circulation; moreover, their approximation after operation leaves no wound stress. Lateral incisions may be strictly transverse, oblique, or in the line of the nerves; they may be extended right into the rectus sheath or as far back as the erector spini. They must not, however, slope in an upward and inward direction.

In the last two years, Sir Heneage Ogilvie said, lateral incisions have practically ousted the lower median and paramedian incisions in his work. For the appendix he uses the gridiron incision—"the baby of the lateral family." He does not hold with deliberate transverse division of the rectus muscles. This often produces much muscle retraction and the gap fills with clot; extensive hernias followed the use of this incision in

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the Middle East campaigns. Vertical incisions in the linea alba or rectus sheath are physiologically sound. The paramedian should not stray more than an inch from the midline, for the separation of planes and the retraction of layers has no surgical sanction. He likes the midline incision, particularly for gastric surgery, and cuts through the umbilicus if extension is necessary; with this incision respiration is not interfered with, and the matting of the felted linea alba gives a good grip for the subsequent sutures. The right and left paramedians are standard doors to the abdominal cavity, but in septic conditions, such as the gangrenous gall-bladder, he prefers to cut through the rectus muscle and sheath in the same plane.

In the closure of an abdominal incision it should be remembered that the function of stitches is merely to approximate living tissue; fibroblasts bridge the gap. Whatever suture material is used, if tension is present pressure necrosis will follow and lead to separation. Closure must be thorough—a peritoneal chink may lead to disruption or hernia; a hæmatoma or dead space may lead to infection, and this may burst into the peritoneal cavity. A continuous everting mattress suture of fine catgut will help to produce a smooth neat surface not favouring adhesion formation. For the gridiron incision a peritoneal purse-string leaves only a dimple on its deep surface. For the muscle layers of the lateral incision a continuous suture is all that is necessary, since there is no strain. In the median and paramedian incisions there is considerable transverse stress, and interrupted sutures are required. To close the skin adequately all dead spaces and fatty layers need to be obliterated, either by deep tension or deep skin sutures. Michel clips or fine edge-to-edge skin stitches (removed after three to four days) are necessary for accurate epithelial approximation.

After briefly discussing other incisions used, Sir Heneage Ogilvie ended by saying: "A patient who loses his wife can find another; one who seeks treatment in response to an advertisement, either a frank one or a discreet paragraph in the evening press, gets the kind of doctor he asks for; but the man whose abdominal wall or inguinal canal is ruined is indeed betrayed by the profession to which he has entrusted his health."

Mr. DIGBY CHAMBERLAIN said that in placing the abdominal incision three main factors require consideration—adequate access to the affected structure, and the need for a firm abdominal wall and a scar which within limits should not be unsightly. The anæsthetist plays a fundamental rôle in the abdominal operation, for good relaxation makes all the difference. Mr. Chamberlain prefers intracheal intubation, and with this the only retractor occasionally necessary is the assistant's hand. Inadequate relaxation during abdominal closure encourages the escape of the omental tag between the peritoneal stitches and is often responsible for starting a hernia. He deplored the small incision and quoted with approval the remark: "If you are in a strange country and need an abdominal, find out the surgeon who makes the biggest incision." Not only are blind manipulations dangerous but the causa causans is often missed when too small an incision is employed. In making the incision nerves should be avoided, and splitting the rectus denervates the inner segment; hæmostasis is essential, and it is better to displace muscles than to divide them. None of his patients are Yogis, who spend their days contemplating their abdominal wall, and it is rarely justifiable to use an abdominal crease incision merely for the sake of a more beautiful scar. But that does not mean that the surgeon should be dilettante about the closure of the skin incision, for no surgeon enjoys being remembered by an ugly scar. A sharp knife, and the excision of any previous scar in the line of the operation are also essentials. The right or left paramedian incision is Mr. Chamberlain's standard method; this is perfectly satisfactory for colon work, for the mesentery is attached to the central part of the posterior abdominal wall. For the gastric ulcer and carcinoma he prefers a left paramedian, for the duodenal ulcer a right paramedian. For the acute appendix lesion he uses Battle's incision, though it has the disadvantage of not being extensible; if larger exposure is necessary he closes the peritoneum, extends the skin and anterior rectus sheath incisions, and displaces the rectus muscle outwards. For operations on the biliary tract he uses a right paramedian, or occasionally in very fat patients a subcostal incision. The peritoneum is closed with continuous catgut, and if it is thin a small bite of rectus muscle is taken at the same time. The anterior rectus sheath is closed with interrupted stitches; tension sutures and Michel clips are used for the skin. Where drainage is necessary it is advisable to insert a separate stitch in each layer next to the tube, to allow for possible erosion of the stitch. The surgeon should not hand over the abdominal closure to his assistant, until at least the peritoneum has been closed; sooner or later there is bound to be some misunderstanding about a swab, and the risk of hernia formation between peritoneal chinks necessitates special care.

METABOLISM AND HEALING

Prof. JOHN BEATTIE discussed the metabolic disturbances which follow a deliberate or accidental injury. He drew attention to the large negative nitrogen balance which reaches its peak towards the end of the first week after injury, declines during the following two weeks, and becomes positive during convalescence. Associated with this negative nitrogen balance are the appearance of cortin in increased quantities in the urine and the increased utilisation of vitamin C, leading to the disappearance of this substance from the urine even when the intake is many times normal. He discussed the various hypotheses which have been put forward to explain these findings. He drew attention to the different responses to injury in the debilitated patient when the increased nitrogen and cortin excretions are absent. The types of dietetic treatment necessary to avoid excessive protein breakdown in the tissues and to ensure speedy wound healing and rapid convalescence were outlined. He correlated the work of investigators in this country, Canada, and the United States on the problems of wound healing, and showed that there is entire agreement on the point that in the immediate postoperative days it is important to secure a high protein intake by mouth or if necessary by the intravenous infusion of protein hydrolysates. Where possible the debilitated patient should be treated intensively with high protein intakes before operation is attempted. In this way not only is convalescence made more speedy but the postoperative mortality is lowered.

DISCUSSION

Mr. RODNEY MAINGOT remarked on the astonishing variety and ingenuity of abdominal incisions; there is one for almost every letter of the alphabet. He was brought up on the vertical incisions, but in recent years has gradually been drifting away from them. The lateral incisions are a great advance; but he has been becoming more and more attracted to the transrectus muscle approach. This is physiologically sound and gives good exposure, especially with secondary abdominal operations, in which it often provides entry into an area of abdomen free from peritoneal adhesions. These incisions heal well provided the layers are carefully sewn up with interrupted stitches, preferably of fine silk. He sutures the sheath only and not the muscle. Division of both recti, as first described by A. E. Maylard of Glasgow in 1907, is likely to become more popular.

Sir CLAUDE FRANKAU was anxious to do battle with Sir Heneage Ogilvie about Battle's incision. Thirty years ago, he said, he used the gridiron incision, but for the last 29 years he has removed all his appendices with Battle's incision. It has served him well, and he has not found it necessary to cut any nerves. If drainage is needed it is important to bring the tube out through the upper end of the wound, for this prevents any possible erosion of the deep epigastric vessels. Sir Claude Frankau emphasised the mercifulness of the large incision, and said that he has never used a self-retaining retractor. A straight paramedian is his incision of choice. He has never done a Kocher's incision but on a number of occasions has repaired hernias through it.

Mr. W. E. TANNER remarked that it was the practice of Sir Arbuthnot Lane to leave the peritoneum unsutured in his peritonitis cases; it would be interesting to know the subsequent incidence of herniæ.

Mr. HAROLD DODD advocated the Rutherford Morison type of incision for the acute appendix, with extension, if need be, by transverse cut into the loin. It gives first-class exposure with good healing. The lateral

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cutting incision is a useful approach for the combined abdomino-perineal operation. He does not like upper midline incisions because quite 25% subsequently develop herniæ. The paramedian is a better incision; in operations on the stomach and gall-bladder care should be taken to extend it well up to the xiphisternum. Kocher's incision is good at times, but often disappointingly unreliable. The transverse incision is useful for splenectomy. To obtain good wound healing careful protection of the wound edges is necessary, and he therefore sews his skin towels to the peritoneum.

Mr. J. P. HOSFORD had practised both the gridiron and Battle's incision, and in his view the grid was undoubtedly the better approach. Transverse incision, he thought, will increase in popularity; sisters constantly urge on him how much more comfortable and smooth is the patient's convalescence when one has been employed. Drainage, where necessary, should always be via a stab wound. To drain through the original incision is like having a foot within the door; it requires only a little heave to start a hernia.

Mr. R. S. CORBETT favoured the gridiron incision for the appendix lesion, but urged the importance of knowing the ways of enlarging it to get out of difficulties. It can be extended by opening into the rectus sheath or by converting it into the Rutherford Morison muscle-cutting incision. Mr. Corbett prefers the paramedian incision for routine surgery, although he agreed that with the transverse type of incision convalescence is usually smoother.

Mr. ANDREW MONRO urged that the long incision for, say, a perforated peptic ulcer is not necessary. The chances in favour of a perforated ulcer being duodenal are 8 to 1, and this can be dealt with through a small incision.

Mr. S. M. COHEN said we have been "rectus strung" too long by tradition; he had joined with the many who are taking more and more to the transverse and oblique types of incision. The paramedian rarely provides direct access; it needs good relaxation, and troublesome hæmorrhage at the intersection sites is a disadvantage, often leading to mutilation of rectus muscle fibres. The incision is a travesty of surgical principles, for it necessitates much separation of tissue planes. Sepsis in the abdominal wall is often viewed lightheartedly and it is commonly held that the peritoneum is a barrier to its inward spread. But this is not true. Infection in the abdominal wall can burst into the peritoneal cavity, and this, rather than soiling of the peritoneal cavity, is often responsible for the late peritonitis. When wound infection is anticipated penicillin has an important part to play, but animal experiment has shown that to be effective penicillin therapy must be started early. He favours the gridiron incision for the appendix lesion, since any resulting gut adhesion to the wound almost invariably involves the colon rather than the small intestine. Battle's incision carries the risk of small-intestine adhesion; thereafter the Sword of Damocles of obstruction dangles over that patient's abdomen. Professor Beattie's work on nutrition and wound healing is of the utmost importance to the surgeon. In operations for growth—particularly of the stomach and gastro-intestinal tract—"protein cocktails" will come to be a valuable aid in preoperative treatment.

Sir HENEAGE OGILVIE, in replying to questions, agreed that getting patients up early is an advantage; the bedpan imposes a severe strain on the abdominal wall. For the intra-abdominal abscess he advises the straight-through incision: he prefers the separate stab drain, but this is often found to drain through the main wound. He has had no disruptions with the midline incision; the modern advertisement, with its attractive drawings of rectus-cutting incisions, should not be allowed to mislead. The method of using multiple retractors to give full exposure cannot be countenanced; the best tribute that can be paid to an abdominal surgeon is that he rarely uses a retractor.

Reviews of Books

Shaping of Psychiatry by War

JOHN RAWLINGS REES, M.D., brigadier; consulting psychiatrist to the British Army; director of the Tavistock Clinic. London: Chapman & Hall. Pp. 158. 10*s*. 6*d*.

WAR-TIME medical essays, when they lose their flavour of recency, often moulder for lack of preservative detail: but these Salmon lectures by Brigadier Rees have the vitality that goes with faith and a sense of achievement. The sense of achievement is confidently based on the enlarged scope and successes of the psychiatrists in the British Army; the faith is that "we have something of value to say in almost every major problem of society—in the planning and maintenance of peace, in the management of nations and their affairs, and in other questions of this magnitude and importance. . . . Our particular skill and aptitude do enable us to make a contribution to the solution of all problems in which human factors are involved." The case is stated persuasively, but will not altogether convince those who hold that the work of Service psychiatrists at its best has been a happy mixture of common sense, empiricism, and expert knowledge, with the last sometimes getting the credit due to the first.

Principles and Practice of Rectal Surgery

(3rd ed.) WILLIAM B. GABRIEL, M.S. Lond., F.R.C.S., surgeon to St. Mark's Hospital and to the Royal Northern Hospital, London. London: H. K. Lewis. Pp. 432. 45*s*.

IN this third edition the statistical matter has been brought up to date, setting standards of analytical study and particularly of pathological investigation which will stimulate all. Proctitis, a subject in need of classification, has been given a new chapter—perhaps not quite as helpful as the general quality of the work had led us to hope, but that is praise of the general quality. The detailed technical advice on major and minor surgical procedures stands the test of constant satisfied reference on occasions of difficulty. Mr. Gabriel's own choice of operation for favourable cases of carcinoma of the rectum is the one-stage perineo-abdominal combined excision. The reader is referred to other publications for a description of the synchronous technique which has proved so helpful, particularly to less experienced surgeons, often turning the scales favourably in a borderline case. Treatment before and after operation is given careful thought, and to all interested in rectal work, whether apprentice or master, this is an important book.

Die spezielle Pathologie und die Verletzungen der Mundgebilde

A. FONIO, professor of surgery in the University of Berne. Berne: Huber. Pp. 200. Sw.fr. 12.80.

INJURY and disease of the oral cavity and related structures are well described. Unfortunately, in order to keep down the cost, illustrations have been omitted, apart from a few diagrams, and this reduces the general value of the book. In the section dealing with fractures of the jaws there is no mention of English work during the war, and even in the other sections nearly all the references are German. In view of censorship difficulties, however, this is understandable.

Gas and Air Analgesia in Midwifery

G. H. T. STOVIN, M.R.C.S., D.A., anæsthetist and lecturer on analgesia in midwifery, City of London Maternity Hospital. London: Staples Press. Pp. 76. 5*s*.

IT is debatable whether a midwife with little background of medical or scientific training needs to know much more about gas-and-air analgesia than she can get from such a book as that by Minnitt. There is a need, however, for a book from which anæsthetists and interested midwives, already experienced clinically, can learn more about the mechanical side of their art: such things for example as how analgesia machines work and how nitrous oxide is manufactured, purified, and compressed into cylinders. Dr. Stovin's book provides this and similar information with a clarity and an accuracy not found in most other anæsthetic textbooks. It is a pity that this is achieved at the expense of clinical methods, which occupy only 24 of the 70 pages. The book is scarcely suitable either for a midwife studying analgesia for the first time, or as the basis of her teacher's lectures. As a reference book to current gas-air analgesia apparatus it is good, and it can be recommended to those who wish to know the working details of such machines.

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THE LANCET

LONDON : SATURDAY, JANUARY 26, 1946

Compensation

IT is now more than seven weeks since the MINISTER OF HEALTH announced in the House of Commons that he contemplated action which would "probably have the effect of preventing the sale and purchase of practices of doctors taking part in the new service." He promised at that time that there would be "an appropriate measure of compensation to doctors in respect of loss of capital values directly caused by the new arrangements," and said that he would hold immediate discussions with the profession's representatives about the way in which this decision should be carried out. Commenting on this announcement, we expressed the view [1] that these discussions would "so closely affect the whole future of so many individual doctors that the profession will expect, and be entitled to, the fullest and earliest information." But the weeks have gone by and no word has come from the MINISTER or from the Negotiating Committee to indicate that agreement is being reached on the subject. Coinciding as it does with an accelerated release of doctors from the Forces, this delay is causing no little anxiety and is proving a serious obstacle in the resettlement of those released.

The anxiety has been in no way allayed by the words which the MINISTER used when he spoke to the Chartered Society of Physiotherapy on Jan. 5. Questioned about compensation for possible loss of practice value he remarked that "whenever the State stepped into any field and provided a service for the population which the population knew they wanted and another form of service became obsolescent, the State was then asked to pay compensation for the obsolescent service. Why, he did not know. There was no justification for it." True, he then went on to repeat that the State is in this instance proposing to compensate the doctors, but he made its offer sound more like an ex-gratia payment than a true purchase of goodwill. The note he sounded—a note almost of antipathy to the whole conception of compensation—has made many doctors wonder just what the MINISTER will be found to regard as "an appropriate measure of compensation."

Almost certainly, as soon as an announcement about the general terms of the settlement is made, the compensation likely to be paid for any given practice will ordinarily become the ceiling price for that practice: and should it prove to be something considerably less than the customary and expected practice value, then many doctors will feel aggrieved—whatever may be the legal position. And it is undeniable that, on many, such a decision would inflict real hardship. Particularly is this true of the older doctors, men and women of 65 and over, most of whom have had to postpone their retirement because they were so urgently needed in practice while their younger colleagues were away on service. They now seek, and deserve, to retire. Usually the major part of the capital on which they have been relying for support in their retirement is represented by the value of their practices. Any sharp depreciation of this expected value would often make it impossible to give up work. But it would be neither just to the practitioner nor advantageous to the community if, for lack of a proper pension or the means to obtain an adequate annuity, he were forced to struggle on, giving, with greater effort as the years go by, a deteriorating service to his patients until such time as he died in harness. At the other end of the scale another group that might well be hard hit by insufficient compensation includes those younger doctors—many of whom have been, or are still, on service—who carry an undischarged burden of debt originally incurred in the purchase of a practice. Their pressing financial problems will not be easily solved should it prove that they are credited in compensation with a sum appreciably less than what they still owe.

These are matters which are easy for all doctors to understand—ones they understand far better than the more theoretical issues involved in planning administration. We believe that much care and thought have been, and are being, given to finding ways of instituting and administering the service, so that it may be fair and satisfactory for patient and doctor alike; but, however well devised the service proves to be, mundane considerations of pay, pension, and compensation will all need to be amicably settled if the new régime is to begin with the willing coöperation of the practitioners taking part. This coöperation would be absent if large numbers laboured under a persistent sense of injustice.

In spite of Mr. BEVAN'S words, doctors looking round observe that when other interests such as the coal-mines or the Bank of England are taken under the Government's wing compensation is paid to the dispossessed owners, and paid apparently in a way not generally unacceptable. Medical practitioners ask no more than that they too shall, on surrendering their right to dispose, by sale, of the goodwill of their practices, receive what they consider a proper measure of compensation. We realise that the total sum invested in medical practices is very large. We appreciate that it may be necessary to agree that repayment shall ordinarily be made only on retirement or death, so that the Treasury may spread the full discharge of this debt over thirty years or more. But granted acceptance of conditions such as these, we see no reason why Treasury sanction should not be given for compensation so closely approximating to normal expectations of practice value as to involve no real hardship to any doctor, whether he is due to retire now or not for another thirty years.

Gateway to the Abdomen

THE attitude of surgeons to the abdomen has passed through three phases within living memory. From the dawn of history till the years that some of us can remember the abdominal cavity was forbidden territory. The ancient Greeks are said to have removed the spleen to improve athletic prowess, though how they did it and what their mortality may have been is not recorded; but their successors,

1. *Lancet*, Dec. 15, 1945, p. 781

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realising that the dangers of laparotomy far outweighed any possible advantage to the patient, rightly preferred in the treatment of abdominal catastrophes to let nature take her course, aided or obstructed by purges, clysters, or shrapnel prescriptions. With the advent of antisepsis the abdomen became the happy prospecting ground for all surgeons. LISTER is not known to have opened the abdomen, but his followers did so with avid zeal and remarkable success. Starting with the removal of large simple and pedicled tumours, they proceeded to interventions of increasing complexity, and, as this new field revealed for the first time in their early and curable stages diseases that had hitherto been seen only in the post-mortem room, they added repair and reconstruction to excision. They looked on the abdominal wall as a barrier to their enterprise and were more concerned with the speed with which they could get through it than with the harm they did in doing so, more proud of the rapidity with which they could close their incisions than of the security or sightliness of the resulting scar. When the rush of exploration was over, when all intra-abdominal organs had been attacked and all technical devices had been tried, surgeons began to think less of new operations, more of doing the old ones better. Advance in anæsthesia made things safer for the patient and easier for the surgeon, and removed the need for hurry. Rapid operating, once the criterion of the good surgeon, became the hall-mark of the adolescent or the ass. Improved instruments and sutures were devised. Pre- and post-operative treatment were studied and found to affect the result no less than the manner of the operation itself. The abdominal wall became as important as its contents, and was now respected as an indispensable constituent of the respiratory and circulatory systems, and as the chief factor maintaining the position of the viscera. It was no longer an obstruction to be torn aside, but a vital mechanism to be preserved, and incisions were planned with a view to leaving its action unimpaired.

The search for the perfect abdominal incision continues, and during the present month the subject has been discussed on two occasions: at the section of surgery of the Royal Society of Medicine on Jan. 2 (reported in this issue), and in the Moynihan lecture of the Royal College of Surgeons delivered by Prof. WILLEM NOORDENBOS of Amsterdam on Jan. 9. Some general principles are accepted on all sides. An abdominal incision must allow access to the viscus which is the object of attack and for the manipulation which is contemplated. It must be extensible to allow for a possible increase in the scope of the operation. It must have regard to the structures it divides and the line in which it divides them. It must not cut nerves, for if they are interrupted irreparable weakness follows. It may divide muscles, which heal with a scar that is harmless if it is strong and narrow, or aponeurotic structures that heal by their own tissue, and it will be followed by sounder and more certain repair if these structures are divided in the line of their strain rather than across it. The symposium at the Royal Society of Medicine disclosed a greater degree of unanimity than might have been expected when a group of surgeons get together to discuss a subject on which each can claim to be an expert. Those hoary veterans, the Kocher and the Battle, were supported and attacked with equal vehemence, but there was a clear tendency among the majority of those present for oblique and transverse incisions to replace the vertical ones, and for incisions in one plane to replace the multi-layered approach. The lateral oblique incisions of Rutherford Morison secured almost universal commendation. Professor NOORDENBOS, who received an enthusiastic welcome on his first visit to Britain after five years in German-occupied Holland, during which he suffered a long period of imprisonment for his Anglo-American sympathies, delivered a scholarly account of the development, anatomy, and functions of the abdominal wall in their relation to operative approaches. The rectus arises in a fused group of segmental muscles, the upper three intersections representing prolongations of the 8th, 9th, and 10th ribs and carrying the 8th, 9th, and 10th intercostal nerves along their lower borders much as the ribs do. The lateral muscles of the trunk oppose each other across the midline and exert a strain on the rectus sheath that is in the main transverse. The best incisions—those which lie in the line of strain and leave the nerves unharmed—are therefore transverse ones across the rectus, or rather incisions in the line of the nerves, transverse above the umbilicus where the 9th nerve runs horizontally, upwards and inwards in the epigastrium, and downwards and inwards in the flanks and hypogastrium.

It seems certain that these lateral oblique incisions will find increasing support among surgeons; they are founded on sound principles, give excellent access, and heal well. It seems equally certain that the pararectal incision for appendicitis, like its longer and more mutilating brethren along the outer border of the rectus, will pass into the limbo of forgotten atrocities. The place of incisions which cut the rectus muscle across its fibres is more problematical. These give excellent exposure. They are mechanically sound in relation to the rectus sheath which is cut in the line of strain, but not in relation to the muscle which is cut at right-angles to its stresses and has no appreciable fascial envelope to hold stitches. They can be approximated accurately by interrupted sutures through sheath and muscle, and if all goes well and healing is by first intention the muscle suffers no more than one extra fibrous intersection, and keeps its function unimpaired; but if the patient strains, coughs, or becomes distended, if a hæmatoma appears between the muscle ends, or if sepsis follows, a transrectus wound may break down completely. These transverse incisions in the epigastric, umbilical, and hypogastric regions will find their place in clear planned operations, but in emergency surgery, and particularly in the surgery of abdominal wounds, they are to be avoided.

Non-Tropical Disease in Africans

THE war carried many physicians and surgeons into tropical Africa, and their experiences are now being published. Three facts emerge. First, as WENYON [1] points out, that the ætiology, prevention, and treatment of most of the tropical parasitic diseases were firmly established even before the end of the first world war. Secondly, that the non-immune British soldier may suffer severely and even

1. Wenyon, C. M. *Trans. R. Soc. trop. Med. Hyg.* 1945, **39**, 177.

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fatally from tropical diseases, yet the indigenous inhabitants often seem to live, at least in adult life, on reasonably easy terms with a small museum of parasites carried unsuspectedly in their bodies. Thirdly, that too little is known about non-tropical disease in the tropics. Inquiries concerning the ætiology of these diseases are often met by evasive answers; they have been labelled tropical—the anæmias are tropical anæmias, the myositis is tropical pyomyositis, and the neurosis is tropical neurasthenia—and that has seemed a sufficient explanation. The next great medical advance in the tropics will probably lie in determining the ætiology of those diseases which are really the familiar ones of temperate climates in a different form. For the common cause of death in the tropics is non-tropical disease. Thus SMITH [2] in Nigeria demonstrated, from 500 autopsies performed on African children, that respiratory diseases accounted for 68% of the deaths, whereas malaria was responsible for only 14%. It may be objected that the large number of fatal respiratory infections were probably only terminal events, grafted on top of many attacks of malaria, but of this there is no proof. It may equally be objected that these pneumonias attacked the subjects of malnutrition, and this view is to some extent supported by the findings of VINT [3] in the highlands of Kenya, where malaria is less common than in Nigeria. Both these pathologists found only one prevailing pattern of malnutrition in infants—the kwashiorkor syndrome with fatty livers (malignant malnutrition as TROWELL [4] calls it); SMITH reported 14 examples of this condition, and also found abnormal amounts of fat in the liver in 58% of the 500 children he studied.

From the impressions of surgery in the tropics recorded by WILLSON-PEPPER [5] and OGILVIE [6] it seems that infected wounds do poorly in warm humid climates but aseptic surgery can be as successful there as in Britain. Staphylococcal infection of wounds is common, but streptococcal infection is not, except in highland areas. Tropical ulcer is still the commonest minor case in a surgical ward, and its ætiology remains obscure. GREEN and EVANS [7] have commented on the frequency of tropical pyomyositis, and DENNISON and DICK [8] have noted that the earliest stage is a coagulative necrosis of the Zenker variety, usually beginning in the larger muscles of the limbs and the trunk; many cases are later complicated by an infection with *Staphylococcus aureus*. This common surgical disease did not affect British soldiers in the tropics; its ætiology is unknown and treatment is unsatisfactory. It is generally agreed that acute appendicitis is rare in African peasants (STONE [9] has recorded one case), but its incidence is increasing among Africans in Nairobi, Kenya, perhaps because they are changing many of their customs. Gall-stones and cholecystitis, and renal calculi are also relatively rare in Africans.

Puerperal sepsis and obstetrical difficulties, on the other hand, are common; PRESTON [10] has remarked that miniature pelvis (generally contracted pelvis) is the most usual deformity in Kenya, and attributes it to malnutrition during childhood.

The frequency and severity of the pneumonias surprised the visiting physicians, who had expected to see little of this disease in the tropics.[11] Pneumococci account for almost all the cases; Africans appear to fall an easy prey to these organisms, and WRIGHT [12] has noted the high incidence of pneumococcal meningitis and pneumococcal endocarditis among them. There was an impression at one time that Africans never suffered from hypertension, but this idea probably arose in hospitals where sphygmomanometers were seldom employed. Essential hypertension is certainly rare among the simple peasant folk, but WILLIAMS [13] has recorded 23 cases in the relatively more advanced and better-fed tribes of Uganda. His studies into cardiac disease have revealed that aortic syphilis and aneurysm are remarkably common, whereas rheumatic carditis is relatively rare, and that though acute infective endocarditis is prevalent, streptococcal subacute infective endocarditis has not yet been detected in Africans. Cardiac angina, coronary thrombosis, and severe atheroma are all extremely rare diseases in the African. The other diseases of stress are also uncommon; primary thyrotoxicosis is almost unknown in the African, and peptic ulcer is uncommon, though it is said to be increasing with the march of civilisation. Anxiety neurosis (as distinct from phobias connected with magico-religious practices) is hardly ever seen, and only an occasional college student qualifies as a case of insomnia. GODDARD [14] has reported 12 cases of effort syndrome, and a simpler pattern of this syndrome has been reported by MUWAZI and TROWELL,[15] who found that many Africans become alarmed when they first notice their heart-beat during fevers and other states where it is exaggerated. Streptococci do not flourish in the tropics as they do in temperate climates. Sore throat is seldom streptococcal, and scarlet fever is an extreme rarity. The African suffers from acute nephritis at least as often as the European, but the commonest variety in Africa follows a subacute course, and in chronic nephritis HENNESSEY [16] noted at autopsy less cardiovascular changes in Africans than in British cases.

Among diseases of the nervous system the African is prone to meningitis of all varieties. Cerebral malaria is rarely reported among adults in hyperendemic areas of malaria, but it is often seen in less heavily infected areas during epidemics of malignant tertian malaria. It is doubtful if any case of disseminated sclerosis has been recorded in an African living in the tropics. Syphilis of the nervous system is extremely common,[15] usually of the meningovascular type; non-syphilitic arterial disease is seldom the cause of hemiplegia and though the African often gets a cerebral thrombosis he hardly

2. Smith, E. C. *Ibid*, 1943, 36, 287.
3. Vint, F. W. *E. Afr. med. J.* 1931, 7, 349; *Ibid*, 1937, 13, 332.
4. Trowell, H. C., Muwazi, E. M. K. *Arch. Dis. Childh.* 1945, 20, 110; *Trans. R. Soc. trop. Med. Hyg.* 1945, 39, 229.
5. Willson-Pepper, J. K. *Brit. med. J.* 1945, ii, 812.
6. Ogilvie, W. H. *Lancet*, 1945, ii, 585.
7. Green, J. C. L., Evans, W. *Trans. R. Soc. trop. Med. Hyg.* 1943, 36, 359.
8. Dennison, W. M., Dick, A. L. *J. R. Army med. Cps*, 1944, 82, 112.
9. Stone, P. H. *E. Afr. med. J.* 1944, 21, 241.
10. Preston, P. G. *Ibid*, 1942, 19, 223.
11. Murray-Lyon, R. M. *Trans. R. Soc. trop. Med. Hyg.* 1944, 37, 287.
12. Wright, F. J. *E. Afr. med. J.* 1942, 19, 108, 138.
13. Williams, A. W. *Ibid*, 1944, 21, 328, 368; *Ibid*, 1938, 15, 279; *Ibid*, 1939, 16, 2, 341.
14. Goddard, D. L. H. *Brit. med. J.* 1945, i, 908.
15. Muwazi, E. M. K., Trowell, H. C. *E. Afr. med. J.* 1944, 21, 2.
16. Hennessey, R. S. F. *Ibid*, 1939, 15, 329.

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ever has a cerebral hæmorrhage. Similarly he often suffers from general paralysis of the insane but hardly ever from tabes dorsalis; BILLINGTON [17] has recorded one case. Liver disease is almost the rule among Africans, and a completely normal liver is seldom seen at autopsy. Hepatitis accompanies many known bacterial infections [18] and some cases are doubtless examples of infective hepatitis; others have an uncertain ætiology and may reflect protein deficiency. Cirrhosis is common, even in young adults; it is often portal in type, but almost as frequently the fibrosis is coarse and there are large areas of hyperplasia, which suggests postnecrotic scarring. GILLMAN and GILLMAN [19] in South Africa have demonstrated by liver biopsy the relationship of fatty liver to the kwashiorkor syndrome. From all parts of Africa primary hepatic carcinoma, grafted on cirrhosis, is often reported, whereas it is almost unknown in Europe. EVANS [20] and others [21] have established the frequency of sickle-cell disease and sickle-anæmia in Africa. Anæmia appears to be almost universal and reflects the strain of parasites and deficiencies of iron and extrinsic factor in the diets of the Africans.[22]

It is generally agreed that Africans are poorly fed. ANDERSON [23] has observed the beneficial effects of giving a liberal diet, containing 3100 calories and 120 g. of protein daily, to African soldiers. Even on this diet, however, it was impossible to produce dynamometer readings which could be favourably compared with those of British soldiers—in other words, it was impossible to repair the damage done by malnutrition during the period of growth. "The African," OGILVIE [6] writes, "is occasionally a fine physical specimen, but more often he is stunted and weakly. If dietetic measures are to correct this state of affairs in the African adult they must be applied in childhood—or even in intrauterine life."

Headache in Malaria

A REPORT from America [24] suggests that nicotinic acid will sometimes relieve the intractable headaches occurring in the intervals between malarial attacks. To 25 men who complained of headache which was attributed by the examiner to malaria, 100 mg. of nicotinic acid was given by mouth. Complete relief some thirty to forty minutes after taking the drug was reported by 10 patients; partial relief was reported by 7; while in the other 8 it had no effect. Duration of relief varied, but usually it continued for several days. Where the headache recurred every day, 50–100 mg. of nicotinic acid after breakfast every morning provided effective relief; the dose was determined by individual requirements. Zeligs has found all other remedies useless in this type of headache; he suggests that nicotinic acid should be given a wider trial, particularly in view of its safety. The treatment aims at obtaining cerebral vasodilatation, in view of the isoagglutination and capillary stasis known to occur in cerebral malaria.

17. Billington, W. R. *Ibid*, 1942, **19**, 197.
18. Muwazi, E. M. K., Trowell, H. C. *Ibid*, 1942, **19**, 40. Stephenson, R. W., Kirk, R. *Trans. R. Soc. trop. Med. Hyg.* 1943, **37**, 189.
19. Gillman, J., Gillman, T. *Nature, Lond.* 1944, **154**, 210; *Arch. intern. Med.* 1945, **76**, 63; *J. Amer. med. Ass.* 1945, **129**, 12.
20. Evans, R. W. *Trans. R. Soc. trop. Med. Hyg.* 1943, **37**, 281; *Ibid*, 1945, **39**, 207.
21. Smith, E. C. *Ibid*, 1934, **28**, 209. Trowell, H. C. *E. Afr. med. J.* 1945, **22**, 34. Reid, R. D. *West Afr. med. J.* 1936, **9**, 15.
22. Trowell, H. C. *Trans. R. Soc. trop. Med. Hyg.* 1942, **36**, 151; *Ibid*, 1943, **37**, 19.
23. Anderson, T. F. *E. Afr. med. J.* 1943, **20**, 207.
24. Zeligs, M. A. *J. Amer. med. Ass.* 1945, **129**, 796.

Annotations

SIXTY YEARS OF MEDICAL DEFENCE

THE diamond jubilee of the Medical Defence Union was commemorated last week by a luncheon in London. The president, Mr. St.J. D. Buxton, recalled that it was incorporated in 1885 by C. F. Rideal and a group of laymen, whose purpose was to provide doctors with insurance against prosecutions for malpraxis and attacks by libel or slander; and to suppress practice by unregistered persons. The next year a Midlands branch was formed under the chairmanship of the well-known Birmingham surgeon, Lawson Tait. In 1887 he was elected the first president, and in the following year articles of association were adopted and the union became an entirely medical organisation. The first decade of its existence was stormy, but by the turn of the century it had become firmly established, with a membership of 4604 and a reserve fund of £7637. Apart from a slight setback in the war of 1914–18, its record has since been one of steady development; its membership now approaches 30,000 and its funds exceed £150,000. In the course of the years the work of the M.D.U. has broadened: apart from helping practitioners with all manner of individual medicolegal difficulties, it has developed the collective defence of the profession. As Sir Alfred Webb-Johnson, P.R.C.S., observed in proposing the toast of The Union, the kind of protection its offers is essential to every medical man and woman.

EVALUATION OF CHOLERA VACCINATION

CHOLERA is perhaps the most easily controllable of the pestilences that have in the past swept across the world. It has not appeared in the United States for over seventy years, or in Europe for the last two decades. Yet in India and in China it is still one of the major epidemic diseases and in India alone it claims an average of 200,000 victims a year. It could almost certainly be banished from these countries also by suitable sanitary reforms, notably by the provision of protected water-supplies for their teeming millions. In the course of time, measured by generations, these reforms will no doubt be carried out, and then cholera may disappear from the world; but in the meantime the public-health authorities in the affected countries have been compelled to adopt palliative measures, one of the most popular of which has been prophylactic inoculation. This has been practised widely in India since its introduction by Haffkine over fifty years ago, and has seemed to be very successful, but the sceptics have often pointed out that its value has never been established on sound statistical evidence.

To meet this criticism advantage was taken of a severe epidemic in 1942 and 1943 in Madras Province to make a scientifically planned and carefully executed statistical investigation of the results of anti-cholera inoculation.[1] The area investigated had a population of about three million, of whom about a quarter were inoculated and the balance were used as controls. The vaccine was made at the King Institute, Guindy, from "Agawa" and "Inaba" strains of *Vibrio choleræ*; a single dose of 1 c.cm. containing 8000 million organisms was given to adults and half this dose to children. Of 709,977 "protected" persons, 1118 developed cholera, and among 2,119,568 uninoculated persons there were 34,336 cases of cholera. Analysis of these results suggests that "protected" persons are 12–14 times less likely to get cholera than the unprotected, that immunity is established even on the third day after inoculation and increases progressively for at least five weeks, and that the immunity conferred lasts up to a minimum of five

1. Report of the Scientific Advisory Board of the Indian Research Fund Association for 1944.

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months and probably as long as ten to twelve months. There was some evidence that inoculated persons who developed cholera were less likely to die of the disease than those who had not been inoculated, but the difference in fatality in the two groups was not great, and the main value of the vaccine lies in the fact that the inoculated are less likely to get the disease.

There was also evidence, derived from villages which were visited more than once by cholera during the epidemic, that inoculation during the first outbreak produced a herd immunity that had a favourable effect on subsequent outbreaks. In this observation lies some hope that inoculation may prove more than a palliative measure of control, but it is rather a slender hope in view of the relatively short duration of the protection provided by inoculation. It might be possible to banish cholera from an endemic area by a very extensive inoculation campaign, but unless the fundamental sanitary defects were corrected it would still be liable to reinfection from a neighbouring endemic area.

It is good to know that in cholera vaccine we have a method of prevention of proved value, since there are many circumstances in which it is obviously the method of choice; but it will be a pity if vaccination is allowed to claim the attention of public-health authorities to the exclusion of the more permanent methods of controlling cholera and incidentally many other intestinal infections —the provision of safe water-supplies for all the inhabitants of cholera endemic areas.

INDUSTRIAL ABLEMENT AND REABLEMENT

AT the official opening last week of the first residential industrial rehabilitation centre started by the Government, Mr. Ernest Bevin, the Foreign Secretary, expressed the hope that doctors would familiarise themselves with the work of this and similar centres. It is hoped that this is but the forerunner of many Ministry of Labour centres throughout the country. The centre near Egham was established almost two years ago for the physical and mental rehabilitation of men disabled in the Forces and industry, and since then a thousand men have passed through it. Of these about half have returned to their former jobs or other suitable occupations, and most of the remainder have proceeded to other establishments for further training. The newcomer to the centre is medically examined on arrival. The first part of his stay is spent in physical and mental reablement and in regaining confidence; at this stage he is engaged largely in physical training and physiotherapy. At the end of this period he has a talk with the industrial manager, who is guided in advising a career by the medical report, the man's aptitude, and the availability of jobs in industry. Whether it is decided that he should return to his former occupation or embark on a new one, he can acclimatise himself to his work by using the workshops and other facilities in the centre. When he leaves Egham to start work, or for a further course of training, he does so knowing what to expect and what he is capable of accomplishing.

No-one will deny that there is a place for such centres. The only doubt can be why they were not established long ago for the benefit of the injured and the misfits in industry. And why should the system be restricted to righting damage already done? The war has brought out the supreme importance of selection for the various types of Army employment; the time has come when experts in job-analysis will play an increasing part in industry. Why should not centres similar to that at Egham be set up to help youths choose their job before they start work? Such centres would be analogous to the primary training centres which have operated successfully in the Army.[1] Too often, youth has its future decided by local availability of work, by family tradition, or by casual lack of consideration. Selection centres should be available to all, but compulsory for none. Formal intelligence and aptitude tests can provide no rigid guide; but if these were reinforced by practical facilities for boys to show themselves and others where their bent lay an immense contribution would be made to industrial efficiency and happiness.

1. Rees, J. R. *Brit. med. J.* 1943, i, 1.

SINGLE MASSIVE DOSES OF SULPHONAMIDES

EHRLICH originally thought that organic arsenicals should be administered to patients with syphilis in one massive dose (therapia magna sterilans), and for some years a few injections were believed to effect a cure. After the last war, however, the view grew up that a permanent cure can only be obtained by maintaining an effective level of the drug over a long period. In the last few years, particularly in the United States, intensive arsenical therapy has returned to favour, and satisfactory early results have been reported after a seven-day course of 'Mapharside' and bismuth subsalicylate.[1] Similarly with penicillin, good early results in syphilis have followed a five-day course totalling 9,000,000 units,[2] and in gonorrhœa [3] spectacular success has been obtained with 100,000 units given in 5 or even 3 injections two-hourly, though a single-injection technique has been less satisfactory.

In the sulphonamide therapy of bacterial infections, Golden and Meyer [4] now advocate the administration of a single "massive" dose of 9 g. by mouth. They base this view on their experience with sulphonamides applied intraperitoneally in cases of peritonitis. They are satisfied that a single dose of 9 g. applied in that way has proved effective without any subsequent maintenance dosage, though it is less than the amount usually advocated for the first 24 hours of sulphonamide therapy,[5] half of which is commonly given as an initial dose. In this way they claim to counter the tendency of organisms to become resistant to sulphonamides, and to avoid the "masking" of symptoms which continued administration may cause. A strong case must, however, be made out before the clinician can be advised to abandon the maintenance dosage, controlled by blood-level determinations, which has proved so successful in practice.

Most of the sulphonamides are fairly rapidly excreted in the urine, especially sulphanilamide which Golden and Meyer use as "a typical sulphonamide." When a single dose is given, a maximum level is reached in the blood and tissue fluids within a few hours; the concentration rapidly falls to an ineffective level and finally to zero when the drug is completely cleared from the body. The object of maintenance dosage is to keep the sulphonamide concentration in the blood between 5 and 10 mg. per 100 c.cm., which has been shown to be the minimum bacteriostatic level, for a long enough period to allow the body tissues to develop antibodies. If we still accept that the action of the sulphonamides is mainly bacteriostatic, success must depend on the host completing the kill, except when the infecting organism is highly susceptible. The clinical experience has been that infections tend to relapse unless sulphonamide therapy is continued for 4–5 days. It has been demonstrated that the bacteriostatic effect is not directly proportional to the concentration in the body fluids, and little therapeutic advantage is gained by increasing the sulphonamide concentration beyond 10 mg. per 100 c.cm., until the very high concentrations that occur with local application are attained. The dangers of ineffective sulphonamide concentrations have been emphasised by many writers and are avoided by the accepted dosage methods. The

1. See *Lancet*, 1944, i, 280.
2. Lourie, E. M., et al. *Ibid*, 1945, ii, 696.
3. Leading article, *Ibid*, Jan. 12, 1946, p. 58.
4. Golden, B. I., Meyer, S. W. *J. int. Col. Surg.* 1945, 8, 225.
5. M.R.C. War Memo. no. 10, London, 1945. Spink, W. W. Sulphanilamide and Related Compounds in General Practice, Chicago, 1943.

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variation in the absorption and acetylation of sulphonamides is well known, and it is because of this variation that estimations of the sulphonamide level in the blood are so important. Without them it is impossible to tell whether absence of therapeutic response is due to inadequate absorption or distribution of the drug, or to insensitivity of the infecting organism.

A single dose of 9 g., provided that vomiting does not occur and that absorption is normal, would be expected to raise the sulphonamide concentration in the blood to between 10 and 20 mg. per 100 c.cm. within a few hours. This is unlikely to be maintained for long and the level will fall progressively during the next 24 hours or more, being probably too low to be effective for the greater part of that period. Consequently the organism will be subjected to an effective dose for a short time, but to an inadequate dose for a somewhat longer period, which is surely the danger which Golden and Meyer claim to avoid. Their suggestion that the massive-dose method enables the physician to discover the best chemotherapeutic agent by trial and error within 7 days appears unsound, for unless the blood concentration is known a therapeutic assessment of the sulphonamide being used cannot be made.

The clinical evidence which Golden and Meyer produce in support of their hypothesis is slight—their paper is intended to be only a preliminary report. In no case are sulphonamide blood levels recorded. At least 6 of the 8 cases described are of an indeterminate character with an unpredictable natural course, and several seem to indicate the inadequacy of the single-dose method rather than its efficacy. It may be that an infection with a highly sulphonamide-sensitive organism could be controlled under certain circumstances by a single dose, but as a routine method the procedure advocated by Golden and Meyer cannot be recommended on theoretical, experimental, or clinical grounds.

MALARIA AMONG MERCHANT SEAMEN

IN the past, merchant seamen have suffered heavily from malaria contracted during calls at ports in the tropics. The disease usually declared itself after the ship had put to sea beyond the reach of medical help; consequently it often escaped recognition until it had reached a stage where treatment was seriously handicapped, and many valuable lives were lost. Apart from this, if many of the crew were laid up at one time, the ship and the lives of all on board might be exposed to serious risks from understaffing and consequent overstrain for those who remained on duty. The Ministry of War Transport is therefore to be congratulated on producing two excellent memoranda (revising earlier publications) on the prevention and treatment of malaria among merchant seamen, one intended primarily for masters of ships which do not carry a doctor,[1] and the other for ships' surgeons.[2] Each of these is clear, up to date, accurate, and practical. That for masters of vessels is the more interesting, and ships' surgeons should certainly not neglect it.

If the advice given in these memoranda is faithfully acted on—it often seems strangely difficult to ensure the necessary coöperation of men whose own health is in question—there should be very little malaria on ships, and no deaths. Only one point seems to need reconsidering: the treatment of severe malaria complicated by vomiting. The memorandum to shipmasters rightly says that "the correct treatment is to administer quinine intravenously or mepacrine intramuscularly," but we find it hard to accept as inevitable the restriction which follows—"but this cannot be done unless there is a qualified doctor on board." The alternative measures advised are orthodox enough: bicarbonate of soda in warm water, hot fomentations or a mustard leaf to the abdomen, sucking of ice, and sedatives. If these measures fail and the vomiting persists, the advice is that, after 12 hours: ". . . mepacrine (if it cannot be administered intramuscularly or intravenously) must be administered by the lower bowel (per rectum)." Unfortunately the measures advised will seldom control vomiting in malignant tertian (*P. falciparum*) malaria, and rectal administration of mepacrine may often fail. In any case, valuable time will have been lost. It seems worth considering whether it would not be possible to train an intelligent member of each crew to give intramuscular injections of mepacrine. The dangers of sepsis or injury from bad technique are not to be underrated, but experience shows that laymen can easily be taught to give an intramuscular injection, and that when they are well trained their methods are not inferior to those of most qualified doctors. Malaria with vomiting is a potentially grave condition, and it seems likely that many more lives would be saved than abscesses or injuries inflicted by a prompt intramuscular injection of mepacrine—even if this had sometimes to be given by someone who was not a qualified doctor.

1. Malaria Among Merchant Seamen. Ministry of War Transport Notice no. M.178. Revised November, 1945. Pp. 9.
2. Ministry of War Transport Notice no. M.195. Revised November, 1945. Pp. 25.

AMERICAN LIMB-FITTING

IN dealing with amputations, the American army have developed methods which differ somewhat from ours. A report by a subcommittee of civilian consultants, just published by the American War Department, illustrates some of these differences and also shows how actively the study of limb-fitting is now progressing in America. The consultants forming the subcommittee were Dr. Harold Conn, orthopædic specialist at Akron, Ohio; Dr. Paul B. Magnuson, associate professor of surgery at Northwestern University medical school; and Dr. Philip D. Wilson, clinical professor of orthopædic surgery at Columbia University College of Physicians and Surgeons; they have all served on the orthopædic subcommittee of the National Research Council since 1941. They visited army hospitals in Michigan, Utah, Texas, Georgia, Virginia, and Washington D.C. To us, who have so often heard it condemned, it is surprising to read that General Norman D. Kirk, soon after his appointment as Surgeon-General, directed that all primary major amputations in the forward area should be done by the guillotine method: and that the subcommittee believe that stern enforcement of this policy has saved countless lives, conserved stump length, and yielded the best amputation stumps that have ever been obtained. They note that after the operation adequate traction must be applied to the skin of the stump if sufficient soft-tissue covering is to be obtained without unnecessary loss of bone length. They saw stumps in various stages of healing, many of them showing unhealed granulating wounds which had to be excised before the skin could be closed, but the fact that most guillotined stumps require "surgical revision" after reaching the base does not seem to them a serious objection to the method, and the great tenderness of granulating stumps is not mentioned in the report, though it is noted that painful stumps and phantom limbs were rare. They conclude that the surgical treatment of the amputation cases given in the late war is better than any they have previously seen, and far better than in 1914–18, thanks to better treatment of the patient from the time of his injury, better surgery, and the reduced incidence of infections due to modern methods of chemotherapy.

Early in 1943 the American Medical Corps adopted the Trautman artificial limb, which is made of wood fibre. Some weaknesses in the original ankle mechanisms are being overcome, and more sizable feet, of the slipper

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type, are being supplied, the original type having been too small and too slender in the instep. The stump sockets were at first made of leather, moulded over a plaster model of the stump, and then fitted into the shin-piece. Sockets made of a plastic called 'Celastic' promised to be lighter and more sanitary, but failed to keep their shape and had to be given up. 'Bakelite' seems likely to be more successful. Limbs made entirely of plastic or of 'Duralumin' alloy were not thought to have any clearly demonstrable advantage over wood-fibre limbs.

The subcommittee thought highly of the programmes in action for reabling the men who had lost limbs. Those who have lost upper limbs are trained in the use of their appliances by occupational therapists. They undertake bench work, gardening, car-driving, writing, eating, and personal care. They are required to pass a stiff test of accomplishment before being discharged from the army. Those who have lost legs are trained by the departments of physical therapy and reconditioning, and are expected to march to music, and to walk over rough obstacles and loose materials and up and down stairs. During this period of training it is possible to decide whether the limb fits comfortably or is likely to cause abrasions.

The limb shops are said to compare favourably with the best civilian shops the subcommittee have seen, and those working in them showed a keen desire to improve appliances and carry out research. New surgical developments include attempts to improve the Chopart amputation stumps by fusing the ankle and subastragalar joints, and to improve the efficiency of short below-elbow and below-knee stumps by dividing the flexor muscles. Prosthetic improvements include a compound elbow-joint to increase the movement of short stumps, and a double elbow-joint to increase the flexibility of below-elbow stumps.

STUDENTS' FILM UNIT

A FILM unit has been formed by a group of students at Guy's Hospital who are interested in the possibilities of the cinema in medical teaching. The unit is being encouraged by the medical school council, who are lending equipment, and advised by members of the staff who have some experience of medical cinephotography. The aim is to make simple instructional films for use in conjunction with lectures to students, rather than specialised films for postgraduate medical audiences or propaganda films for the general public. The unit is now producing a film called *Actions of Muscles*, which will illustrate the functions of muscles in relation to one another and to the skeleton as a lever system. The films made will be silent, because the cost and technical complexities of sound production would be too great for an amateur unit. If a considerable part of the film is not to consist of titles and subtitles it will be necessary for the lecturer to supply a commentary during the showing of the film. This can be considered an advantage, for it prevents the subject of the film from being treated too rigidly and allows the emphasis to be laid on different aspects according to the lecturer's requirements. Moreover, a silent film can be used by students, with a special viewing apparatus, for individual study, and, as Longland and MacKeith [1] have suggested, a few titles, together with a handbook, will enable the film to be easily understood. Production is necessarily slow, since this is entirely a student unit and work on the film can be done only when the members can get together. Fortunately this limitation is not so serious once the scenario has been agreed on, for then the various groups, each consisting of a small number of students, such as animators, titlers, and those concerned with the filming of the living models, can work on their part of the production in their own time. The unit hopes to produce some useful films; but its members also hope to gain a knowledge of medical photography which will be of use and interest to them after they have qualified.

1. Longland, C. J., MacKeith, R. *Lancet*, 1944, ii, 585.

TOXICITY OF OXYGEN

SOON after his discovery of oxygen Priestley suggested that, while oxygen might be "peculiarly salutary to the lungs in certain morbid cases," it might also have harmful effects. Today, when concentrations of oxygen up to 100% can be administered with a portable mask, it must be realised that oxygen is not exempt from the old adage about having too much of a good thing. A high partial pressure of oxygen in the alveolar air may result either from breathing increased concentrations at atmospheric pressure, as in therapeutics, or from breathing normal air at an increased pressure, as in diving. The stream of publications on this subject, both in America and in this country, has been based largely on work done for the naval authorities. As a result of these investigations, outstanding among which are the contributions of Sir Leonard Hill, diving to 400 feet is now as safe as crossing Piccadilly Circus, but, as has been well brought out in two authoritative surveys,[1 2] there is still doubt about the precise means whereby oxygen produces its toxic effects. One of the difficulties is that in dealing with air breathed under pressure there are various factors that are potentially toxic, apart from the increased pressure of oxygen. These variables include the effect of increased pressure itself, the increased nitrogen pressure, and the increased pressure of carbon dioxide.

Allowing for these variables, it seems that the toxic effect of oxygen is exercised mainly on the nervous system, the respiratory system, and the enzymatic system of the body. This last effect is the most difficult to investigate, and it is only in the last few years that refinements in technique have permitted reliable experiments to be carried out. Stadie and his colleagues [1] believe that "the toxic action of high pressures of oxygen will be explained in the light of inhibitory action on enzymes, with resultant severe disturbance of essential metabolic cellular reaction." Ever since the publication of Bert's classical monograph [3] the convulsive action of high concentrations of oxygen has been repeatedly confirmed experimentally in animals, and there have been reports of similar reactions in man. One of the first of these in this country was that of Thomson [4] who described convulsions in a naval officer who had breathed four atmospheres of oxygen for 13 minutes. A similar reaction was reported by Case and Haldane.[5] The mental effects of oxygen in man were investigated by Phillips [6] who found that the personality type of the individual played an important part, and, as Bean remarks, this psychological factor must always be remembered in assessing the significance of neuromuscular disturbances in man. The mental disturbances described by Phillips occurred at a pressure corresponding to 1·4–1·6 atmospheres of oxygen. But the dominant changes with high concentrations of oxygen (0·8–2·0 atmospheres) occur in the lungs, where the findings may include congestion, œdema, or pneumonia. In the rat massive pleural effusions occur after exposure to 1 atmosphere of oxygen.[7]

That the inhalation of 100% oxygen is not free from risks is suggested by a recent report from Comroe and his colleagues [8] in the United States. In 90 healthy

1. Stadie, W. C., Riggs, B. C., Haugaard, N. *Amer. J. med. Sci.* 1944, **207**, 84.
2. Bean, J. W. *Physiol. Rev.* 1945, **25**, 1.
3. Bert, P. La Pression Barometrique, Paris, 1878.
4. Thomson, W. A. R. *Brit. med. J.* 1935, ii, 208.
5. Case, E. M., Haldane, J. B. S. *J. Hyg., Camb.* 1941, **41**, 225.
6. Phillips, A. E. *Proc. R. Soc. Med.* 1931–32, **25**, 693.
7. Boycott, A. E., Oakley, C. L. *J. Path. Bact.* 1932, **35**, 468.
8. Comroe, J. H., Dripps, R. D., Dumke, P. R., Deming, M. *J. Amer. med. Ass.* 1945, **128**, 710.

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young men, using a full-face mask of the army type, they found that the continuous inhalation of 100% oxygen for 24 hours produced substernal distress in 74 of the subjects, and there was a considerable fall in vital capacity. With 75% oxygen symptoms arose in only 50 subjects, and with 50% oxygen there were no symptoms at all. With 100% oxygen the substernal discomfort appeared in 4–22 hours (average 14 hours). No significant changes were noted in the pulse-rate, blood-pressure, or red-cell and white-cell counts. The respiratory symptoms are attributed to pulmonary irritation. If these changes can be produced in healthy subjects, it seems likely that they will be produced more easily in people with pulmonary lesions. That these observations are of real importance is obvious from the claims that with masks of the B.L.B. type concentrations up to 100% oxygen can be maintained for long periods. Card and his colleagues,[9] for instance, found concentrations of 90% oxygen in the alveolar air of some of their subjects who had used this type of mask. Comroe and his colleagues suggest two reasons why toxic effects are not more common. The main one is that the B.L.B. mask is usually removed every two or three hours for nursing and feeding purposes, and that it often becomes displaced during sleep. In addition, masks are often moved by patients, and unless special precautions are taken they do not fit tightly enough to exclude room air. The other reason is that severely ill patients with pneumonia or coronary occlusion may not notice a superadded substernal discomfort.

In the light of these observations it seems unwise to maintain a concentration of 100% oxygen for therapeutic purposes for longer than 12 hours. After this the concentration should be reduced to 60% unless that is insufficient to saturate the arterial blood. On the few occasions when 100% oxygen is required for longer periods a careful watch should be kept for toxic manifestations.

ABSORBABLE GAUZE AS HÆMOSTATIC

IT has now been established[10] that oxidised cellulose absorbable gauze arrests bleeding not only mechanically but by exerting a specific hæmostatic action. This property apparently depends on the formation of coagula consisting of salts of cellulosic acid and hæmoglobin. In a bleeding wound the gauze swells, turns black, and sticks. This adherence is about as strong as the true clot formed when fibrin foam or gelatin sponge is used as a carrier for thrombin to check surface bleeding. In a deep laceration or cavity dry oxidised gauze is easily handled, and with its use there is no delay as there is when fresh sterile thrombin solution has to be prepared. Experimentally, wet gauze has proved less effective than dry, even when the wetting has been with thrombin solution. Experiments on rats in which gauze was implanted into the subcutaneous tissues of the back showed that gauze not impregnated with blood was absorbed considerably quicker than blood-impregnated material. Even where delay in absorption of the gauze was greatest, there was no naked-eye or microscopic evidence of inflammation round it. Bone is the only tissue where untoward effects have been observed after introduction of the gauze. Perhaps because of its acidity the gauze delays early callus formation in clean fractures and defects; but ultimately repair takes place, and there is no significant delay in open lacerated compound fractures where the gauze is used for hæmostasis and removed after 1–3 days. Oxidised gauze is not suitable as a surface dressing for open wounds, except as a temporary application to check bleeding, because it retards epithelisation. In the tissue fluids it becomes gelatinous and is thus easily removed, whereas on the skin it sticks like dry glue. It is therefore important to place it so that it does not overlap the skin edges.

9. Card, W. I., Smith, J. F., Griffiths, W. J., McSwiney, B. A., Savage, B. *Lancet*, 1940, i, 398.
10. Frantz, V. K., Lattes, R. *J. Amer. med. Ass.* 1945, 129, 798.

DAILY FOR 100 YEARS

To the company of London centenarian newspapers we are glad to welcome the *News Chronicle*, which as the *Daily News* came out under the editorship of Charles Dickens on Jan. 21, 1846. At the beginning of its second century it keeps the liberal outlook with which it began its first. A popular newspaper cannot exist if it ceases to be popular; but politically the *News Chronicle* has often taken an unpopular stand, and its columns daily include much that can be read with interest and profit by the eclectic. With the cleverness that wins power for a journal, it also has the will to use that power well. Fortunately for its many readers the *News Chronicle* is in good hands.

ON Jan. 22 the scientific committee and trustees of the R. L. St. J. Harmsworth Fund presented £5000 to Sir Alexander Fleming, F.R.S., and £2500 each to Sir Howard Florey, F.R.S., and Mr. E. B. Chain, PH.D., in recognition of their work with penicillin in the treatment of infective endocarditis.

On Active Service

CASUALTIES

KILLED

Major HARRY WILLIAM GILBERT STAUNTON, M.R.C.S., I.M.S.
Captain JOHN MOCKLER, M.B. N.U.I., I.A.M.C.

DIED

Squadron-Leader EUSTATIUS WILLIAM BARTON GRIFFITHS, M.B. N.Z., F.R.C.S.E., D.O.M.S.
Flight-Lieutenant JAMES LAWRENCE CONNOR, M.B. Belf.
Captain W. LLOYD, R.A.M.C., and Captain P. ISAAC, R.A.M.C., were among the 21 passengers who lost their lives when a Dakota of R.A.F. transport command flew into a hillside near Marseilles in a snowstorm on the night of Jan. 15.

WOUNDED

Captain J. C. COMLINE, M.B. Edin., R.A.M.C.
Captain D. R. I. MASON, M.R.C.S., R.A.M.C.
Lieutenant J. G. SEABLE, R.A.M.C.

PREVIOUSLY REPORTED PRISONER OF WAR, NOW REPORTED MISSING, PRESUMED KILLED

Surgeon Lieut.-Commander D. N. RYALLS, L.M.S.S.A., R.N.V.R.

AWARDS

M.C.

Captain S. P. DUTT, M.B., I.A.M.C.

MENTIONED IN DESPATCHES

R.A.M.C.

Colonels. — N. P. BREDEN, W. J. OFFICER, O.B.E., M. MACR. PATERSON, O.B.E. (killed in action).

Lieut.-Colonels.—D. G. ADAMSON, J. MCK. JOHNSTONE, W. G. MACDOUGALL, A. J. MARTIN, O.B.E., D. J. O'RYAN, R. P. SMYTH, O.B.E., J. A. STRONG, M.B.E., W. G. SUTCLIFFE, W. L. PETTER.

Majors.—T. FITT, W. R. N. FRIEL, T. GRIFFITHS, A. J. MOFFETT, H. G. PAGE, R. A. PHILP, A. E. G. RIDGWAY, J. G. SCOTT, M.B.E., R. K. A. VAN SOMEREN, R. WIGGLESWORTH.

Captains. — D. M. P. R. CLARKE, H. D. COCKBURN, M.C., L. R. DALTON, W. DRUMMOND, J. A. FARRELL, P. E. HELME, M. H. HUGHES, J. F. MARK, C. M. MCGEOCH, J. W. F. RICHARDSON, M. F. RONAYNE, I. H. STEWART, A. H. WILLIAMS, J. A. MCPHERSON, P. R. ROBINSON.

I.M.S.

Colonels.—J. D. GRANT, G. B. JACKSON, V. E. M. LEE.

Lieut.-Colonels. — L. H. COOPER, M. B. MENON.

Major A. C. GREENE.

Captains.—BULWANT SINGH, C. T. SHAH, E. B. NAUG, M.C., B. J. PEREIRA, J. M. PINTO, H. A. PRESS, B. ROWLATT, S. N. SINHA.

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Special Articles

A GERMAN MILITARY HOSPITAL IN 1944

J. K. WILLSON-PEPPER
M.B. Camb., F.R.C.S.
HONORARY ASSISTANT SURGEON, YORK COUNTY HOSPITAL; FORMERLY TEMPORARY MAJOR R.A.M.C.

THE following is a description of a German military base hospital housed in permanent hospital buildings under what, in war, would normally be regarded as ideal conditions, with all such facilities as running hot and cold water readily available, and with an abundant supply of equipment and drugs.

The hospital was captured with its personnel and held about 1800 patients, mostly German wounded. The medical officers were young men in their early thirties, except their senior surgeon, who was aged about 50. They were always in spotless white gowns, which contrasted strangely with the grim squalor in which they worked. Their nurses, on the other hand, looked for the most part badly dressed and untidy, and some of them had septic lesions about their hands; a few were in an advanced state of pregnancy; and one had septicæmia due to an infected needle used on her during a blood-transfusion.

WARDS AND PATIENTS

The windows of the wards were all firmly closed, even those in which chest cases were being nursed, and the stench of dirt and rotting humanity was abominable. The sisters often slept in the duty room in this atmosphere, which they appeared not to notice. The sterilising-room in the theatre had also a bed made up in it, some plates, a loaf of bread, and the theatre sister's underclothes hanging up to dry on a line. The steriliser, which they had been using for four years, did not raise enough pressure to be effective, a vital and elementary point of which they appeared not to be aware.

On entering a ward one had the impression that it was full of dying men. The patients were haggard, listless, and toxic, and many had the sunken eyes, hollow cheeks, and pinched noses of the facies Hippocratica. Those who were nearing the end of their vital resources had a dry inelastic rugose skin, greyish in colour and covered in epithelial scales. Their bodies were shrunken and dehydrated. They lay in massive plasters or were attached to the strangest of mechanical improvisations, making some wards look like Heath Robinson drawings come to life, but with a sinister Hogarthian twist.

GERMAN TREATMENT

Most of the compound fractures had massive rubber drains, passing from entry to exit wound, which had been left in situ for months. These drained, through a window cut in the under surface of the plaster, into a kidney dish or cigarette tin which was stuck by dried discharges to the mattress, and in which cigarette ends were often floating. To our amazement we found that in some cases the drains had been inserted and then plasters applied over the outside, so that they could only drain into the interior. For some mysterious reason many of the fractured femurs had hip spicas in which two Kirschner wires and attached horseshoes had been incorporated, both below the site of the fracture. These plasters included many slats of wood, and we usually took 2½ hours to remove one of them and apply a Tobruk or other splint. Pressure sores were rife under the plasters, and some patients had sores over both scapulæ, the dorsal spine, the sacrum, the anterior superior spines, and the heels. In some cases the spinous processes of the mid-dorsal region could be seen sticking out of an ulcer. Almost all these bad cases eventually proved fatal from septic absorption from the sores. Among them were 14 patients who had undergone excision of the hip-joint, and all but one of them died. The exception survived after an amputation at hip-joint level.

There were about ten patients in whom a complete arthrodesis of the knee-joint had been performed for septic arthritis following a penetrating wound. All these survived. The rationale of this operation and that of resection of the hip-joint was, we gathered, that they hoped to save the limb by sacrificing the joint.

The Germans took great pains to locate and remove metallic foreign bodies, using a modification of a mine detector,[1] but, since practically no case escaped without having one or more large rubber tubes inserted deep into the wound, it seems that one foreign body was being replaced by another and much larger one. I feel that this would not be a fair comment if the drain were removed in a matter of days, but most of those we removed had been in situ from two to four months, the longest time being nine months. It was interesting to note how often severe compound fractures of major bones seemed to unite in spite of all this.

Definitive amputation through healed tissues did not appear to be an accepted policy, and I saw one final re-amputation done in the presence of a wound pouring with pus, when (so far as I could judge) there was absolutely no indication for further immediate operation. This attitude of mind argues a total disregard for end-results. We learnt soon enough what end-results to expect from this kind of surgery.

Some patients with empyema had been put into the wash-room at the ends of wards, so that their drainage tubes could be attached to suction pumps fitted on the basin taps, the tubes from the patients lying along the floor like hose-pipes. The atmosphere in these improvised wards was beyond belief, and it is a wonder any of the men survived. It is almost certain that, during the last three weeks the Germans were in charge, no window was ever opened. It is only fair to state that none of the patients with chest wounds died, though several were extremely ill, and some had already formed thick-walled chronic cavities. One patient was demonstrated to me whose radiograms showed about 8 in. of rubber tubing inside the chest cavity. I was informed that this would be withdrawn gradually as the level of the fluid dropped.

We did not observe any deliberate attempt to carry out Hitler's policy of eliminating the badly wounded, but their methods nevertheless seemed to achieve this result with remarkable frequency.

There did not appear to be any physiotherapists attached to the hospital, and, so far as we could discover, there was no serious attempt at rehabilitation. Men with upper-limb injuries, who would have been regarded by us as ambulatory cases, had lain in their beds for months, and even these had bedsores.

We soon discovered that the patients were seldom washed, and that there had been a wholesale administration of morphine. One German ward sister was observed to take a syringe with a single needle and inject all those who asked for it every night.

Washing the patients, opening the windows, and the judicious withdrawal of morphine from possible survivors caused an even further drop in morale, and I think many of them were now convinced they were being maliciously done to death. But I believe that these three factors, after the lapse of a week, turned the scale for many of these men, and it was extraordinary to see how their lifeless apathy changed, and how they began to eat and how their haggard faces began to look human. Patients started to recover whom we had given up for hopeless long since, and even the morphine addicts began to realise that they were not being deliberately tortured. Of those we took over about a quarter died, the rest being evacuated to the United Kingdom as soon as they were fit to travel.

GENERAL OBSERVATIONS

On looking back over the work of these German surgeons, one is amazed at the depths to which their surgery had sunk. They seemed to have a purely mechanical outlook on human flesh and bone and to think they could mend a limb as a plumber would a pipe. The general condition of the patient appeared to mean nothing; nor did they seem to have even an elementary understanding of the basic principles of wound healing. Their results were further debased by the quality of the nursing, which in many instances did not rise above the level of emptying the slops. It certainly did not rise to changing the tins and kidney-dishes under the plasters,

1. See *Lancet* annotation, 1941, i, 699.

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for these were so firmly stuck to the mattresses that we tore the mattresses in trying to detach them. They told us that their experiences in Russia had taught them that the more modern methods had not proved successful. We felt that they and our surgeons of the Crimean War would have understood each other.

CONCLUSION

One may speculate about the possible causes of the conditions here described. In their defence one may say that a high percentage of their nurses were untrained, that the organisation was overloaded and finally overwhelmed by the chaos caused by a major military disaster, and that their medical staff was inadequate in numbers. But many of the patients were suffering from the effects of surgical treatment applied months before, when the hospital was several hundred miles in the rear of the fighting, and when no big retreat had yet begun.

My own interpretation is that eleven years of political tyranny had so narrowed their vision that progress in medical science had passed them by; and, as I cannot believe that the German military hospitals of 1918 were so bad as this, I can only assume that their standards had fallen.

In conclusion I wish to pay tribute to the magnificent work of the Queen Alexandra Nursing Service and to our R.A.M.C. orderlies, who worked night and day under great difficulties to bring this situation under control.

In England Now

A Running Commentary by Peripatetic Correspondents

FOR fifteen months I had been told that the finest view in India was that of Bombay from the stern of a troopship. And for fifteen months I had sworn regularly, at a certain stage of intoxication, that I would play the appropriate and most characteristic of all soldier songs on a musical instrument that I happen to carry as my own ship sailed. In the actual event no sound of that song was heard, and, though three thousand troops were on board, there was no excitement. A few only of us leant over the after-rail and watched the sailing boats, the circling gulls, and Bombay's water-front dissolve into misty hills and the dim outlines of the Southern Ghats. And so good-bye to India, probably in my own case for ever. What are one's memories of the time one spent there?

First there is the India seen from the trains—hours and days of dusty hot travel, teeming hundreds, beggars and tea-stalls (always Hindu and Mohommedan separately) on the stations; and between them huge arid plains, once inimitably described by a British soldier as "miles and miles of sweet-all, with cows eating it," or something as near that as no matter.

Then there is the India of the cities—dirty, overcrowded, hungry Calcutta, where you may easily meet a sacred bull or see a famine victim on the pavement of the main street; Delhi with its remains of Mogul splendour and its new counterpart trying self-consciously to look imperial in the Lutyens manner; rich cosmopolitan Bombay, and not quite so rich, steamy Madras.

Then there is the India of the hills—the expensive artificiality and abandon of Srinagar and the shock of going from the burning plains to the cold of the mountains at fourteen or fifteen thousand feet.

Then there is the India of the Indian Army—the infinitely aggravating Indian soldier, continually abused by those who have never begun to understand him, treated with a fatherly regard and affection by those who have, and not infrequently with unbounded respect by those who have fought with him. The Indian Army may cease to exist as we know it, but its traditions will some day be recognised as having played no small part in the building of the new, and we must hope happier, India that is to be.

Then there is the India of the clubs, the Army and Navy Stores, and the cantonments. Into the three most exclusive of these clubs no Indian may put his head, be he prince or rajah, officer of a high-ranking British order or holder of the King-Emperor's commission, distinguished scientist, or millionaire industrialist. They must be the most outstanding examples of colour prejudice in the world today. The atmosphere of Britain in India, which I shall always see myself through a faint haze of gin and bitters, must be lived in to be appreciated, though I am told that some suggestion of it can be savoured in the more refined parts of Cheltenham.

And lastly there is the India of religion, caste, and politics, which I frankly do not understand and probably never shall. Here is a parting word of advice. If you want to have a clear picture of this India, read a book or two or go to a few lectures. On no account visit the place.

* * *

Amid the jostling multitude of points which need careful thought—and fair solution—in any national scheme for employing doctors is the opportunity which the middle-aged G.P. is to have (*a*) to forsake general practice for some specialty, (*b*) to have a long holiday for travel, (*c*) to retire to pursue his bent or hobbies in some field outside medicine, or (*d*) to take up an easy half-time job which would give him leisure for things outside remunerative practice. Many practitioners who have worked strenuously for 25 years or so have been looking forward to doing some of these things, either through the generosity of younger partners whose lives and incomes they have improved by their longer experience, or by converting their practices into cash. If these two ways in which the younger men can help their seniors are ruled out by the national scheme, are the doctors over 45 to get first chance of long leave, or be allowed to take their pensions and go at once? If not, I think grave injustice will be done to them.

* * *

Is it a damnable pedantry which besets me in my middle age, or is it right that I should be outraged by the misuse of the negative whereby I am beset when I read a modern book, a current newspaper, or listen to some of the news bulletins of the B.B.C.?

The question is prompted by a hasty reading of a recent work which has received much praise in many of those sections of the press concerned with literature. In the author's note, which follows the foreword, the reader is warned by the ingenuous but—to my mind—appalling sentence: "This book lays no claim to any special degree of scholarship or research; I have had access to no documentary sources hitherto untapped." Even this naïve apology scarcely is adequate to excuse the lapses of a similar nature which reach their apotheosis (*is that the right word?*) on page 85: "In a sense he never did write again with the validity and gusto of those early days. . . ."

I have investigated the views of no literary commentators, such as Fowler, in this matter; I have no evidence but my own untutored knowledge of no language save my own; nevertheless, the tendency revealed in this and other works to misuse the negative seems to mark an epoch—and no up-grade epoch at that—in modern literary fashion of no time but our own, for which I hold no brief at all, I don't.

* * *

Why do we celebrate centenaries? Is there any special magic in 100, or is it the thin end of the metric wedge unobtrusively inserted to bring our traditional Sumerian sexagesimal system tumbling to the ground? Why don't we celebrate the 120th anniversary of an event and the 140th (twice the "allotted span") of a man's birth? Why these unprofitable questions? Because this is the bicentenary of one of the most famous of truants from medicine—William Curtis, born at Alton on Jan. 11, 1746.

At 14 years of age Curtis was apprenticed to his grandfather, an apothecary there; but young Bill spent much of his time botanising and "bug-hunting" with the ostler of a local inn, Thomas Legg, with the help of Gerard's *Herbal*. So, to stop the rot, his tanner father sent him to complete his medical education in London under one Talwin, a licentiate of the Society of Apothecaries. Curtis later succeeded to Talwin's practice but sold it in 1771 and acquired instead an acre of land in Bermondsey, where he started a botanical garden. In the following year he was appointed Præfectus horti at the Society of Apothecaries' Chelsea garden, conveyed to them some fifty years earlier by another famous medico, Sir Hans Sloane.

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For the next five years Curtis looked after the two gardens, his and the Apothecaries', and planned his great work *Flora Londinensis*, which he began to publish in 1775 and continued to publish till 1798. He gave up his duties at Chelsea in 1777 and thereupon began to remove his own garden from the industrial haze of Bermondsey to the comparatively salubrious air of Lambeth Marsh, where he opened his "London Botanic Garden" on Jan. 1, 1779. After 10 years here Lambeth proved no better than Bermondsey for his plants; so he moved his garden again, this time to the site now occupied by the Brompton Hospital.

In 1781 Curtis started his *Botanical Magazine*, which is his chief claim to fame and is still going strong in its 165th year. But he did not forsake that other love taught him by Thomas Legg—entomology. He was one of the original fellows of the Linnæan Society and was the first to show that aphides were the sole manufacturers of honey-dew. In 1782 a popular scare was caused by a great increase in the number of caterpillars of the brown-tailed moth; so Curtis investigated the natural history of this insect and wrote a pamphlet to prove that the people's fears were groundless. His first published work was "Instructions for Collecting and Preserving Insects" (1771), and later (1772) he translated Linnæus's *Fundamenta Entomologiæ*.

William Curtis died of heart disease on July 7, 1799, and was buried in Battersea church; but I prefer to imagine him:

"In botanic garden, lying at his ease,
Under the *Catalpa bignonioides*."

* * *

To rise from bed one morning with facial palsy is a strange experience. I knew something was wrong. With a twisted morning yawn I stumbled to the dressing-table mirror to find my well-remembered creases of mouth and brow all neatly ironed out on one side to characterless simplicity, and that the other fellow in the glass was laughing at me with a lopsided sneer. Differential diagnosis in such a personal complexity was no easy matter, particularly when the missis, with tear-stained face and anxious eyes, kept asking what was wrong; and when I, with more emphasis than truth, kept repeating that I was certain it was just a chill.

So I was grateful when I heard her on the 'phone asking a colleague to postpone his shaving and come at once. It was then that I remembered some of the things I would have said if I had been summoned urgently when my breakfast was performing its morning chorus in the frying-pan; and it was then that I swore that if I recovered I would never again, verbally or otherwise, malign a patient who sent me an urgent call in any extremity of mind or body, however trivial his complaint turned out to be when I got there. Perhaps as a promise it was a bit of a whopper, for when I looked at my face again I am sure I saw my enfeebled muscles trying to grin at me, as if to say they'd heard those good intentions before.

* * *

The other day I got my car on the road after three years in cold storage. I expected all manner of troubles but the worst I found was perished rubbers on the windscreen wiper. I blessed the unknown experts who made the old car. But now I'm not so sure that I want the car back. After only a week of this smelly form of travel I feel the old inertia creeping back. Too much sitting in seats that cramp the stomach up, sluggish liver, tobacco, grease, scooting dogs, and kerbstone gaps in the parking places which just won't take the car. My dirty old bike reproaches me every day when I rev up the engine and glide away.

Since 1942 I have pedal-pushed for 14 miles a day, resisting, at my 56 years, the temptation to race the American jeeps and motor-bikes. Since 1906 I have pedal-pushed through most of our lovely English countryside. Now I am back to the "Have you seen Battle Abbey? Yes, we passed it the other day" sort of thing. "Look!" I cry to my boy. "There's a steam-roller!" But before he can look we have left it too far behind. A month ago we should have stopped and begged the driver for a ride; or perhaps we should have stopped for the simple pleasure of stopping and idling about or of building castles in the roadside heaps of sand. It is nice, of course, to load half the house on the car and be in Hastings for tea. It is fine to see Ashdown Forest again, if only for a brief picnic there. But Ashdown Forest, the Beaulieu flats, or Stone Street from Lympne to Canterbury? "Don't you remember," asks my bike, "pushing me from Exeter to Canterbury and back? Don't you remember the race from Manchester to Woodbury Common to see the Hunter's moon rise over the Dorset hills? Don't you remember lugging me over the Styhead Pass? And the wonderful road to the Devil's Bridge; and seeking poets' graves from Stoke Poges to Grasmere?" Don't I remember! Rain and wind, the joy of muscles overcoming strain, the farmhouse suppers by lamplight, the pipes smoked with the glow-worms in the magic summer nights. Sadly I remember also the mass-produced buns and the Welsh rarebits done up in packets (you only have to heat them up on the stove), which journeyed, with the aid of the internal-combustion engine, from Heaven-knows-where, to replace the home-grown delights of my favourite inns. Forty miles of pedalling gives you an appetite for home-grown stuff; but now I am slipping back to levers, gears, and muscles clogged with the metabolic products of rations consumed by the clock instead of by the need. Shall I take arms against this sea of troubles and sell the car? No, I'll go one better than that. I'll put the bike on the car and so have the best of both worlds. When I get, say, to Ambleside or Solva on the Pembroke shores, I will feel the rain on my face again, and, as I quietly seek the lanes, perhaps I will think out a book on *The Contributions of the Internal-combustion Engine to the Prosperity of the Medical Profession*.

Public Health

INCIDENCE OF SCABIES

RESULTS OF RAPID SURVEYS IN SCHOOL, FACTORY, AND HOSPITAL

J. L. BURN
M.D., D.Hy. Durh., D.P.H.
MEDICAL OFFICER OF HEALTH, SALFORD

ADVANTAGE to public health may accrue from holding a periodical survey to determine the incidence of a particular disorder such as scabies. This paper describes a rapid survey of more than 20,000 Salford school-children during August, 1944, and again in August, 1945, by trained workers from the Sorby Research Institute, Sheffield, of which Mr. Kenneth Mellanby, SC.D., was one time director.

Only the hands and wrists were inspected. It has been shown by Johnson and Mellanby (1942) that some 85% of adult males with scabies have signs of the infestation on the hands or wrists. For school-children, Mellanby (personal communication) considers that the corresponding proportion is "in the region of 90%." In a small series of 18 children with scabies, Bartley and Mellanby (1944) recovered a mite from the hands or wrists of every child.

In school.—In the 1944 survey of 20,300 children, 167 previously unsuspected cases of scabies were discovered (111 girls and 56 boys), an incidence of just under 1%. The 1945 survey brought to light 124 cases from the 20,544 children (49 boys and 75 girls), with a lower incidence of 0·6%.

Diagnosis was by extraction of a live mite and microscopical examination. There is thus no doubt that the children really had scabies. It is also certain that in a survey of this type the examination of hands and wrists alone gives an underestimate of the true incidence. For example, some cases will have been missed because the work was done in schools where the light was inadequate for proper examination. Also it was impossible to inspect children who were absent from school at the time.

The usual procedure in examination was for the children to file past the observers, who were seated in the best possible light. In some schools inspection was made from desk to desk where the children were sitting. Each worker inspected 600 children daily. Some clerical assistance was provided. Each child was told to spread out the fingers, and examination by ordinary observation

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of the surfaces of the hands and wrists was made, lasting some 15 sec. In suspicious cases inspection was aided by a watchmaker's lens.

In hospital.—In 1944 some 350 patients in a general hospital were also examined, over 300 of them being in chronic wards. In the 350 examined 8 hitherto unsuspected cases of scabies were discovered, to the surprise of a vigilant and competent staff, to whom nevertheless the visual demonstration of the scabies mite was convincing. In none of the 8 cases was there any evidence of scratching or any report of itching, and the skin reaction was slight or entirely absent. In 1945, of 420 patients examined, 6 (4 chronic and 2 military) cases were discovered.

In factory.—The opportunity was taken, in 1945, of examining 6400 workers in factories in Salford. Only 13 cases were discovered—an incidence of 0·2%. Inspection of factory workers was undertaken, not only to discover the incidence, but also as a novel means of ascertaining possibly-infected children who were contacts of those workers suffering from scabies, a home visit being paid in each of these cases.

IMPLICATIONS

The incidence revealed by these rapid surveys seems high, especially in view of the fact that much time and attention had been devoted to the diagnosis and treatment of scabies, and that the scabies treatment service had the advantage of having for over two years before the 1944 survey a whole-time trained worker, besides the usual attention given by medical and nursing staff of the public-health department. A 24-hour service of treatment had been provided during the war to treat workers and others at any time of the day or night. Notification by practitioners had been officially in operation for just over two months before the first survey commenced, and has continued.

A domiciliary treatment service is also provided, for contacts who owing to illness, advanced pregnancy, or other reason cannot come to the treatment centre. Such patients may be treated at home by the staff of the centre.

The survey served a useful purpose in bringing for treatment hitherto unsuspected cases; and, as the "family follow-up" was carried out in every case, some infected adults and adolescents, who otherwise would have been missed, were enabled to have treatment. The survey also shows that, even after the anti-scabies methods described, scabies may remain far from conquered in an urban area.

REFERENCES

Bartley, W. C., Mellanby, K. (1944) *Parasitology*, **35**, 207.
Johnson, C. G., Mellanby, K. (1942) *Ibid*, **34**, 285.

INFECTIOUS DISEASE IN ENGLAND AND WALES

WEEK ENDED JAN. 12

Notifications.—Infectious disease: smallpox, 0; scarlet fever, 1355; whooping-cough, 1190; diphtheria, 525; paratyphoid, 2; typhoid, 3; measles (excluding rubella), 777; pneumonia (primary or influenzal), 1445; cerebrospinal fever, 86; poliomyelitis, 10; polio-encephalitis, 1; encephalitis lethargica, 4; dysentery, 344; ophthalmia neonatorum, 78. No case of cholera or typhus was notified during the week.

The number of service and civilian sick in the Infectious Hospitals of the London County Council on Jan. 9 was 1034. During the previous week the following cases were admitted: scarlet fever, 58; diphtheria, 40; measles, 15; whooping-cough, 25.

Deaths.—In 126 great towns there were no deaths from enteric fever, 3 (0) from measles, 2 (0) from scarlet fever, 11 (1) from whooping-cough, 7 (1) from diphtheria, 58 (7) from diarrhœa and enteritis under two years, and 165 (13) from influenza. Figures in parentheses are those for London.

Manchester had 11 deaths from influenza, and Liverpool and Bradford each had 7. Manchester and Liverpool each reported 10 fatal cases of diarrhœa and enteritis.

The number of stillbirths notified during the week was 211 (corresponding to a rate of 29 per thousand total births), including 19 in London.

THE Colonial Office announces the appointment of Dr. A. F. Mahaffy as joint secretary of the Colonial Medical Research Committee. He is at present director of the Yellow Fever Research Institute at Entebbe, Uganda.

Letters to the Editor

APPOINTMENT FOR SERVICES RENDERED

SIR,—The boards of many hospitals are inviting applications for appointments to their honorary staff. The advertisements generally refer to the eligibility of men serving in the Forces and say that the appointment will be held for a successful candidate until he is demobilised. These gestures are appreciated. Unfortunately, however, the intended equality of opportunity is prejudiced because hospital medical committees—the real selecting body—think themselves obliged to recognise the claim of the person who has been temporarily holding the appointment. Service-men interviewing hospital secretaries are often told that there is little use in their applying because the doctor who has been performing the duties is a candidate for the position, and will most likely be appointed. A similar statement is made to them when paying courtesy calls to members of the medical staff: they are told that "Mr. A or Dr. B has been doing the job for the past six or twelve months; naturally he will have a pull, but of course the election is quite open!"; and the end-result is that Mr. A or Dr. B is duly appointed. Apparently it is felt that there is an obligation to recognise "services rendered."

No attempt should be made to compare the merits of services rendered to the State during the war and those rendered to a hospital during the same period of crisis. The profession has been controlled by a central organising body and no just claims to preferential treatment can be adduced either by the doctor who "went" or he who "stayed," since each was subject to the will of an all-powerful authority which decided how his capacities were to be utilised. Furthermore, the man who "went" was seldom able to sit for higher examinations or pursue his desired specialty—advantages which were never denied the doctor who remained at home.

The community has recognised an obligation to those who fight its battles: many institutions, business houses, banks, and the like, have maintained the salary, in part or whole, of staff members serving in the Forces; positions have been kept open until these men were free to return to civil life; the families of those permanently incapacitated have been assisted; and provision is being made for the dependants of those who gave all they had to give that others may live. If the attitude of medical selection committees seems to differ from that of the rest of the community, it may be because they believe that their prime duty is to the sick who are treated in their hospital in peace no less than in war. If this is so, however, surely they should make their selection on the quality of the applicant rather than on any claim arising from "services rendered."

Ex-Service doctors do not ask preferential treatment. But they feel very definitely that medical recommendations to hospital boards should be based on the suitability of the candidates, rather than on recognition of work done at the hospital in the fortuitous circumstances of war.

London, W.1. LIEUT.-COLONEL, R.A.M.C.

HUMANITARIAN TREATMENT OF FATAL BURNS

SIR,—In a grave case of burns of the skin, when the lesion covers two-thirds or more of the total surface of the body and a fatal outcome is inevitable whatever the treatment applied, the patient's sufferings may be a source of distress to the whole ward in which he lies.

In Egypt, in civilian practice, we often see such cases of burns, because suicides commonly soak their clothing with paraffin and set fire to it, and because paraffin stoves are used, which, being often in bad condition, explode with alarming frequency.

To lessen the pain for such patients the practice has hitherto been to administer morphine subcutaneously and intravenously, without ever, however, securing perfect freedom from suffering. With this treatment the pain calms down for a relatively short time only; the patient remains restless and conscious of the gravity of his state, and from time to time he renews his cries and begs for something to stop his pain. Surgeon Rear-Admiral C. P. G. Wakeley, in the chapter "Burns and their treatment" in *Surgery of Modern Warfare*,

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writes that the injection of morphine in certain cases which "can be saved" has to be repeated every hour or even every half-hour. This shows that, even in people less seriously affected than those we are writing of, the effect of the narcotic drug is only temporary and superficial.

In the last twenty cases that we treated for burns involving more than two-thirds of the total surface of the skin, we gave an injection of 'Evipan Sodium' or an equivalent ('Narconumal Roche'). We injected 4 or 5 c.cm. intravenously and the rest of the contents of the syringe intramuscularly. The anæsthetic sleep induced by this means lasts from 6 to 8 hours and is followed by a state of semicomatose somnolence in which the patient's mind is clouded and he is insensible to pain. This state continues for 10 to 15 hours, by which time the patient is usually dead. Should the patient show signs of pain (none of our cases did), there is nothing to prevent a repetition of the injection. We first used this treatment five years ago in a hopeless case of rabies, where all other means of calming the patient had failed.

The reason why a few c.cm. of evipan induce such a long sleep is that the drug is normally destroyed by the liver and eliminated by the kidneys, the two organs which are impaired from the first hour onwards. The barbiturates, under such conditions, are destroyed slowly and are scarcely eliminated at all, and so act for a long time, leaving the patient in a peaceful state until death.

In some of our male patients we could not find any vein for the injection, so affected was the skin. In those cases we injected the drug directly into the corpus cavernosum of the penis—still into the venous system. The same effect was obtained equally quickly and lasted the same length of time. In women or children we could perhaps inject the drug into the sternal marrow, the absorbing capacity of which is quite as great as that of the venous system.

The only objection to our method which might be raised is that the patient thus treated does not recover consciousness or clearness of mind before his death, and that this might put an obstacle in the way of an inquiry into the cause of death. For this reason we do not give the injection until the legal inquiry is over (usually an hour after the accident in Egypt).

H. PICARD.
Jewish Hospital, Cairo. T. BENSIMON.

AT LEAST FIVE THOUSAND

SIR,—Your annotation of Dec. 22 may have been reassuring to those in civilian practice. No mention, however, was made of the fact that, in releasing these 5000 doctors, the authorities have broken their oft-repeated promise that demobilisation should be based on age and service. In fact, the naval authorities have released those whom they could most easily spare up to group 40, but have left many behind. Thus, while doctors of groups 38 and 39 are already dispersed, I know of one surgeon, group 18, who is being retained much against his will.

I write to you because I think it is not commonly realised that the "age and service" principle has thus been flagrantly violated; and because I hope that opinion will be aroused against this forcible retention of doctors who have served without complaint throughout the war years and who now wish to take up, in their turn, the civilian posts which they have obtained.

SURGEON LIEUT.-COMMANDER.

MANAGEMENT OF URINARY INCONTINENCE

SIR,—The patient incontinent of urine, from any cause, presents a trying nursing problem, usually involving frequent changes of bed linen and attention to wet skin. We have found a technique learnt from an American neurosurgical unit useful in keeping the incontinent head-injury patient's bed dry with a minimum of nursing difficulty.

Half the teat of a teat-ended condom is cut off, and a length of thick-walled rubber drainage tubing is threaded for ½ inch into the hole so made, and fixed with strapping. The condom is then applied to the penis, and again fixed firmly with strapping, using both longitudinal and circular strips, so that about 1 inch of the condom projects beyond the glans. The drainage tubing is fixed to the sheet or mattress to prevent kinking, and is led to a receiver. For this we commonly used an empty intravenous-drip bottle, tied to the edge of the bed to prevent its being knocked over.

This appliance could be left unchanged, if it did not develop a leak, for 3 to 4 days. When the condom was changed, zinc cream was applied to the end of the penis. There appeared to be no tendency for the skin of glans or prepuce to become macerated: nor did we notice balanitis. By this means we have kept incontinent patients in a dry bed for as long as 3 weeks.

C. W. M. WHITTY.
C.M.F. R. P. JEPSON.

EFFECT OF LARGE DOSES OF ALKALI ON KIDNEY FUNCTION

SIR,—I venture to comment on the interesting paper by the Malaria Research Unit, Oxford, in THE LANCET of Dec. 1, because I am concerned lest those who do not read closely, and those who do not clearly distinguish between renal function and renal disease, should be misled by the somewhat ambiguous and sweeping terms in which the authors express their final conclusion. The words used may easily convey the impression that large doses of alkali are contra-indicated in severe renal disease, and thus bring into disrepute a method of treatment that is of the greatest value when properly used. This, I feel sure, is not the authors' intention.

It may be recalled that in the experiments described, three normal subjects were given by mouth gr. 60 each of sodium bicarbonate and sodium citrate at 2-hourly intervals for 68, 76, and 24 hours, respectively. As a result all three subjects showed disturbances of renal function, an uncompensated alkalosis, symptoms of alkalosis, sodium and water retention, and other changes. After discussing the nature of these effects the authors conclude the paper with these words: "We consider, therefore, that large doses of alkali should not be administered in conditions where renal failure may supervene."

I have read this statement many times in conjunction with the authors' findings and their interpretation of them but I am still uncertain as to its meaning. The contention seems to be that because gr. 720 of sodium bicarbonate and sodium citrate given by mouth every 24 hours for periods of 68 and 76 hours caused impairment of renal function (and therefore proved to be excessive doses) in two normal subjects, and because a similarly or more intensive course of alkali failed to relieve anuria in some cases of blackwater fever, therefore large doses of alkali should never be given in conditions where renal failure may supervene, presumably, as a natural result of the disease, and not only as a consequence of an excessive dose of alkali.

No-one experienced in the use of alkalis for therapeutic purposes will deny that doses of the order of those described should always be given with caution, but it is surely an overstatement to assert that they should never be administered, even when renal function is already impaired. Surely a dose of alkali may be large and yet not excessive, and may then be used with benefit even where renal function is already impaired by, or renal failure may supervene as a result of, disease? The authors themselves hint at this possibility when they state that "this increased filtration-rate may be beneficial in the early stages of a course of alkali"—that is to say, when the dose is still large though not excessive (my comment). That such an effect is more than a possibility has been known to, and made use of by, many clinicians for the past 20 years. It seems to me that the authors' real meaning is more happily expressed when they remark that ". . . alkalis, if given at all, should not be pressed to extremes." With this I entirely agree.

The effect of increasing doses of alkali on renal function occurs, as the authors demonstrate, in two stages. In the first, through an increased rate of glomerular filtration, renal function (i.e., ability to eliminate) is improved. In the second, because of damage to the cells of the renal tubules, renal function (i.e., ability to concentrate) becomes impaired. In renal disease both the dose of alkali that will cause increased rate of glomerular filtration, and that which will result in tubular damage, may be either large or small, and will vary in different subjects and in the same subject in different circumstances, but, whereas the former is not usually excessive, the latter always is.

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On the other hand, a dose of alkali that is excessive when given rapidly may be administered to the same patient with impunity, and may even prove to be inadequate, when it is increased gradually. For this reason comparatively large doses of alkali may often be given without harm, and indeed with benefit, when renal function (ability to concentrate) is already impaired by disease.

One of the several reasons for giving alkalis in the treatment of renal disease is to induce, and to exploit, this first stage of increased glomerular filtration. By this means it is often possible to relieve anuria and to postpone, sometimes for long periods, inevitable renal failure in chronic renal disease. When adequate doses of alkali have been given for the latter purpose over a long period it will sometimes be found that reduction of the dose is rapidly followed by the final breakdown of renal function that is a natural outcome of the disease.

Many patients with advanced renal disease, and gross impairment of renal function, lead tolerably comfortable and useful lives for many months, and even several years, although the renal tubules have virtually ceased to function. The relatively abundant "urine" voided is little more than a glomerular filtrate, but it suffices to support life. Such patients are entirely dependent on the maintenance of an adequate rate of glomerular filtration; the judicious use of alkalis will reinforce this, and, I believe, sometimes enable it to continue when it would otherwise fail, as, for example, during incidental infections and after general anæsthetics or unwonted physical exertion. Moreover, a "diuresis" may sometimes be induced and maintained by this means in spite of a falling blood-pressure, and I have even known it to continue for several weeks after the systolic blood-pressure has fallen to, and continued at, a level below that at which the kidneys are generally believed to cease to act.

In anuria also alkalis will often induce a profuse "diuresis" that may suffice to tide the patient over until tubular function is resumed. If, as often happens, the tubules are completely destroyed or do not recover, then, in spite of passing an apparently adequate quantity of "urine" for a week or more under the influence of alkalis, the patient's blood-urea will continue to rise and he will die.

Great care is required in regulating the dose of alkali, and the rate at which it is given, if this action of the drug is to be exploited to the best advantage without overstepping the narrow margin, in terms of dosage, that often separates the stage of increased glomerular filtration from that of tubular damage. It is largely for this reason that I have always insisted that alkalis should not be given in the treatment of renal disease until other, and less tricky, methods have been tried, and only then when treatment can be carried out in properly equipped hospitals where the dosage may be continuously controlled by estimation of the plasma bicarbonate and other necessary analyses.

The Malaria Research Unit also refer to the water retention that resulted from their experiments. The administration of increasing doses of alkali invariably causes disturbances in the water content of the body. These occur in three stages. In the first, as the Oxford workers noted, water is retained; in the second it is lost; in the third it is again retained. The first stage is characterised by a relative oliguria and a urine of normal or high specific gravity; the second by a large volume of dilute urine with a specific gravity corresponding to the volume; the third by either a large or a small volume of urine of low specific gravity. In other words, impairment of renal function occurs in the third, but not in the first two, stages. The second and third stages in relation to the water balance probably correspond with the first and second stages referred to in connexion with renal function, and are, no doubt, due to the same causes—increased rate of glomerular filtration and tubular damage. These three stages are less conspicuous in normal subjects (e.g., in the Sippy regime for the treatment of peptic ulcers) because their water and salt stores are normal to begin with; but in some forms of renal disease with œdema all three stages may readily be seen.

In renal disease with œdema, transition from the first to the second stage (in respect of water balance) as a result of alkali therapy is usually abrupt, and it is marked by a profuse diuresis. It is, of course, this diuresis that the clinician seeks to induce and to use for the removal of œdema. Transition from the second to the third stage is as a rule more gradual and is characterised by signs of alkalosis, tetany, and increase in the blood-urea. The margin, in terms of dosage of alkali, between the second and third stages may again be narrow; hence the need for repeated estimations of the plasma bicarbonate, &c.

The intensity of the initial stage of water retention—that is to say, the extent to which existing œdema will increase as a result of administering increasing doses of alkali—depends not only on the total dose of alkali, the rate at which it is given, previous diet, and so forth, but also on the particular alkalis used. It is apparently in part an ionic effect, for it is more pronounced, for example, when using sodium than potassium salts.

For whatever purpose alkalis are given in the treatment of renal disease success will largely depend on recognising the stage present in respect of renal function on the one hand and of the water content of the body on the other; selecting the most appropriate alkaline salt, or combination of salts; and carefully regulating the doses and the rate at which they are given. Alkali therapy, like insulin therapy, requires practice and control by biochemical methods if it is to be used to the best advantage.

It may be, as the Oxford team intimate, that alkali therapy is not a suitable method for the treatment of the renal complications of blackwater fever, the crush syndrome, and "other conditions." Maegraith and Havard have, indeed, shown that intensive alkali therapy of the kind they describe is contra-indicated in a high proportion of cases of blackwater fever. I have no personal experience of the use of alkalis in that disease or in the crush syndrome, but I agree with the Oxford workers when they condemn the giving of large doses of alkali in general by the clumsy methods sometimes recommended.

Alkali therapy in renal disease certainly has limitations. It is contra-indicated in the earlier stages of acute nephritis, for example, but I have generally found that when failure with this method is attributed to its unsuitability it is as often due to faulty technique. I submit that large doses of alkali, when properly used, are not necessarily contra-indicated in conditions where renal failure may supervene as a natural development of the disease, but that, given with caution, they will sometimes be the only means of saving or prolonging life.

London, W.1. A. A. OSMAN.

PSYCHIATRIC EXPERIENCES IN MALTA

SIR,—Brigadier Tunbridge's paper (Nov. 10) on his observations in Malta in 1941–43 has set at least one reader musing on those exciting times. Many were the physiological and psychological lessons brought home by the realities of war. One thing which was very noticeable was the way in which people adapted themselves. In Malta the training of the civilian population in war measures started during the Abyssinian crisis in 1935, with gas-drill and blackouts, when such things were almost unheard of in Britain. The gradual crescendo of war caused practically everybody to develop a way of reacting adapted to the bombing conditions. Old ladies who previously would have screamed at the sight of a mouse showed no more than natural concern when people were blasted to death a very few yards away from them. Many of us who had been thinking in terms of "Southern" and "Latin" excitability and dreaded the incidence of panic, were agreeably surprised at the way in which all classes behaved from the first air-raids until the end. Oddly, but understandably, the only occasion on which some signs of panic were noticed were towards the very end of the war, when an air-raid warning was sounded after the siren had been silent for four months.

One thing which has been recurring to my mind, since the start of the war, has been the anatomy of what goes by the name of "courage." I cannot help thinking that it is made up of many parts: adaptation; curiosity to watch an enemy action; ignorance of the danger being run; shame of appearing inferior to others; fear of a more immediate and certain, though lesser, danger, such as the reprimand of a superior; the unavailability of an alternative; a resolve not to let down one's side; and other factors. Fear may, of course, be just as complex.

Sliema, Malta. EMANUEL AGIUS.

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DARK-ADAPTATION AND PSYCHOLOGY

SIR,—Although Dr. Culpin's statement which I quoted was in respect of a particular incident, no-one, I think, reading the section of his address on Shell Shock and Night Blindness would fail to agree that the quotation fairly represents the more general viewpoint expressed.

I must thank Dr. Culpin for drawing my attention to his paper (*Proc. R. Soc. Med.* 1933, **26**, 655). This, however, further illustrates the necessity of distinguishing between dark-adaptation and night visual capacity, of which I wrote in my previous letter.

My particular interest in this field is instrumentation (*Trans. illum. Eng. Soc. London*, 1945, **2**, 27; *Proc. R. Soc. Med.* 1945, **38**, 155) and I am necessarily concerned in the uses to which tests for dark-adaptation may be put. The work of the experimental psychologists, Craik and Vernon (*Brit. J. Psychol.* 1941, **32**, 75) has shown that the results obtained with normal subjects with a dark-adaptation test (which should be designed as far as possible to evaluate light-sensitivity only) cannot be correlated with the results obtained by more complex tests (which evaluate various other functions additional to light-sensitivity). This is of obvious importance in the clinical application of such tests. Recently, using a dark-adaptation test, Epstein and Lesser (*Brit. med. J.* 1945, ii, 644) have attempted to differentiate between mental disorder and malingering in cases complaining of impaired night vision; this paper may be worthy of Dr. Culpin's attention.

If I, as an onlooker, may presume to say so, the effect of over-specialisation has resulted, in the present instance, in unnecessary confusion and the retarding of progress generally. An "exclusive" tendency is, of course, by no means restricted to any one specialty. For example, physicists and physiologists have, even among themselves, shown a deplorable backwardness in getting together and agreeing on standard conditions for testing dark-adaptation, in spite of the fact that there is a wealth of available data which would enable this to be done. May one not hope that, "in the unprejudiced search for truth," Dr. Culpin, having progressed through the study of physical and physiological science to an understanding of the "man himself," may yet take a leading part in the integration of the work of various observers in this particular field?

London, N.W.10. E. W. GODDING.

BOOKS FOR CZECH STUDENTS

SIR,—On Nov. 17, 1939, the Charles University in Prague was closed by the German authorities. This and other measures designed to destroy the intellectual leadership of Czechoslovakia and eliminate resistance in the universities are already well known; but the difficulties of reconstruction have been less widely publicised.

When the universities reopened after the liberation, 90 professors and 10 lecturers from the universities of Prague and Brno did not return from camps and prisons. With fewer teachers than ever, over 60,000 students, many of whom had passed over six years in exile as soldiers with the British and Russian armies or in forced labour, were waiting to begin or continue their university courses. Apart from the general problems of ill-health, fatigue, and shortage of food and fuel, there were other difficulties peculiar to students, and these have been tackled with resource and courage. There was no coal to heat the university buildings and hostels, so teams of students worked in the mines. The lecture-halls could not accommodate all who wished to attend, so priority was given to resistance members and to older students. The Nazis had robbed the libraries, and no new textbooks had been printed since 1939. Recently I attended the first post-war world students' congress in Prague, and saw copies of the textbooks, printed by themselves, which the students now have to use. These consist of duplicated typewritten sheets in loose folders, reproducing lectures and articles by professors and lecturers. Naturally, only the simplest diagrams can be included. These circumstances, together with six years' isolation from recent developments in science and medicine, constitute a serious check and embarrassment to study.

The British Medical Students' Association is organising a collection of medical and scientific textbooks to be sent to a students' reading-room in Prague. During the war many Czech students have learned English, either abroad to listen to B.B.C. broadcasts or in Britain. There is therefore reason to believe that the value of these books will not be limited to that of a friendly gesture. We wish to appeal most strongly to all who have in their possession used textbooks on medical subjects, on the natural sciences, or of general scientific interest to send them to us. We should be equally glad of copies of medical and scientific journals, and of book-tokens to procure new copies of standard works. The books most needed are illustrated textbooks of biology and histology; textbooks of anatomy; anatomical atlases; and books incorporating recent advances. Gifts should be sent to: the British Medical Students' Association, B.M.A. House, Tavistock Square, London, W.C.1. It is hoped later to extend the distribution of books to other countries.

T. A. MADDEN,
International Secretary.

*** This and similar appeals from the Continent deserve a generous response from the profession in this relatively fortunate country. But the situation requires more than private generosity. The general intellectual undernutrition, amounting in places to famine, cannot be relieved until publishers are given the paper they need for producing the books and journals now in such urgent demand. —ED. L.

A DIFFERENT KIND OF MATRON

SIR,—Your annotation of Jan. 19 makes an assumption which I believe may be unjustified. In these days when tasks traditionally reserved for men are being successfully undertaken by women we should remember the other side of the picture. The advertisement which appeared in the *Times* avoided any reference to the sex of the applicant. Many men are known for the work they have done in improving the comfort and status of nurses, male and female. The Services have trained a large body of men as nursing orderlies. Surely this matron's post could conceivably be filled by a man?

London, W.1. G. B. STANFORD.

Parliament

DOCTORS IN PARLIAMENT

AT the General Election fourteen doctors were elected to Parliament. In December they received a recruit from within the House when Mr. Richard Clitherow, Labour M.P. for Edge Hill (Liverpool), took the L.M.S.S.A. He has since also obtained the Conjoint qualification.

RICHARD CLITHEROW, M.R.C.S. (Lab., Edge Hill), was born in Liverpool in 1902. He was apprenticed to a pharmacist there before joining the Canadian Cavalry and later the Royal North-West Mounted Police. He also served in the Liverpool city police. After further study at the Liverpool School of Pharmacy he qualified in London in 1927 and went abroad to work as a chemist in China. He returned to Liverpool in 1930 and opened a business as a pharmacist. Seven years later he entered the city council as a Conservative but joined the Labour Party in 1940. Before he resigned from the council in 1945 he served on the health and hospitals committee. In 1941 Dr. Clitherow began his medical studies at Liverpool University and in September, 1945, he entered as a student of Lincoln's Inn. In his maiden speech (see *Lancet*, 1945, ii, 508) he asked that tuberculosis should be scheduled as an industrial disease when contracted by health workers in the course of their duties.

[*Press Portrait Bureau*

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Obituary

HERBERT JAMES MARRIAGE

M.B. LOND., F.R.C.S.

Mr. Herbert Marriage, consulting aural surgeon to St. Thomas's Hospital, was one of the few surgeons of our time to practise as a pure otologist. Born in 1872 the son of James Marriage of Beckenham, he was educated at the City of London School. He entered St. Thomas's Hospital with a scholarship in 1891, and took the M.R.C.S. in 1897 and the M.B. two years later. As surgical registrar and tutor at St. Thomas's he gained a sound knowledge of general surgery before he decided to specialise in otology. In this decision he was encouraged by his chief Sir Charles Ballance, who advised him to continue his postgraduate studies at Vienna. Marriage also visited the universities of Halle and Berlin, and after his return to London he obtained the F.R.C.S. in 1902. Two years later, when the new ear department was opened at St. Thomas's, he was appointed aural surgeon, and under his direction its importance grew quickly. The number of beds was increased and in 1924 he acquired the right to a house-surgeon of his own. When he retired in 1932 his department joined with the old throat department to form the present ear, nose, and throat unit.

St. Thomas's and a busy private practice made big demands on his energy and time, but he also acted as aural surgeon to the London Fever Hospital, as clinical teacher in otology and rhinology at the Royal Army Medical College, and as examiner for the D.L.O. of the Royal College of Surgeons. In a sphere in which careful technique is closely reflected in operative results he was deservedly successful. "Marriage's operations on the mastoid bone," writes a colleague, "were based on what he learnt from Ballance, and I have never yet seen anybody who could do a radical mastoid more efficiently. An expert at the skin-grafting technique, he evolved a special method of applying the graft by suction." Thorough and conscientious in all his work, he was punctilious in visiting his hospital cases himself, and could always be relied on to put his best into any investigation or treatment. At the Royal Society of Medicine he was at one time president of the otological section.

In 1910 he married Miss A. G. Richardson of Eastbourne and they had two sons and a daughter. He died at his home at Woldingham on Jan. 12.

HUGH ANTHONY BULSTRODE WHITELOCKE

M.CH. OXFD, F.R.C.S.

Colonel Hugh Whitelocke, who died at Oxford on Jan. 8 at the age of 54, held, like his father R. H. A. Whitelocke, the appointment of senior surgeon to the Radcliffe Infirmary. He was educated at Rugby, Christchurch, and King's College Hospital. When he qualified in 1915 war had already broken out and he saw service in the Sudan before he returned to Oxford to specialise in surgery. He was appointed to the staff of the Radcliffe Infirmary in 1919 and took the Edinburgh fellowship in 1924 and the English fellowship the following year. In 1926, the year in which he was appointed a full surgeon at the Radcliffe, he graduated as M.CH. He also held the posts of Litchfield lecturer in surgery and of clinical examiner in surgery in the University of Oxford, and he was consulting surgeon to the cottage hospitals at Moreton-in-the-Marsh, Buckingham, Shipston-on-Stour, and Thame, and to the National Hospital for Diseases of the Heart at Maids Morton.

In 1939 with the rank of colonel Whitelocke was appointed to command the 16th British General Hospital. He mobilised this unit, which consisted largely of local men, at the Examination Schools, and took it to France in January, 1940. When France was invaded the hospital was evacuated from Boulogne just in time to escape capture. Soon afterwards Whitelocke was invalided out of the Army. His health was not good, but the shortage of surgeons was acute, and he quickly took up his work again at the Infirmary which had become a medical school in 1939.

"Hugh Whitelocke," writes E. C. B., "was one of the most sociable and hospitable of men, and he never allowed his professional work to cut him off from his friends. An effective if somewhat unorthodox golfer, he played regularly at Frilford, where he was captain in 1936. He was also a keen bridge-player and a good shot. While up at the university he was a member of the Christ Church Rugby XV and later he became surgeon to the Varsity team. He was a pastmaster of the Churchill lodge of Freemason and a member of the Apollo lodge. Courteous and genial, he rarely if ever said or did an ill-natured thing, and his good manners and friendly disposition made him one of the most popular men in the neighbourhood."

In 1934 he married Miss Madeleine Shankland.

ALICE JANET McLAREN

M.D. LOND.

Dr. Alice McLaren, who took the London M.D. in 1893, was one of the first five women to do so, and in the same year she set up practice in Glasgow as the first woman consultant of that city. The daughter of a Leith merchant, she was educated privately and at Cheltenham Ladies College, and before beginning her medical studies at Edinburgh she spent two years abroad travelling with her family in Italy and Switzerland. In 1884 she came to London and in 1890 she took her M.B. from the School of Medicine for Women with first-class honours. Postgraduate study in Dublin and Vienna and house-appointments at the Belgrave Hospital for Children in London and at the Leith General Hospital followed, before she finally settled in Glasgow, where she quickly found her place in the group of women then tackling problems of social reform. She became first assistant to the surgeon of the Lock Hospital and later as one of the first two women directors she did much for the reorganisation and reform of the hospital. She was also appointed consultant gynæcologist to the Glasgow Royal Mental Hospital, assistant surgeon to the Royal Samaritan Hospital, and an extra physician to the Royal Hospital for Sick Children. In 1903 she helped to found the Glasgow Women's Private Hospital, the first in the city to be run on a part-paying basis. A member of the staff from its beginning with 8 beds, when she retired in 1932 she was senior gynæcologist to the greatly expanded Redlands Hospital for Women. She died on Dec. 20 at her home in Crail.

KARL WILMANNS

M.D.

NEWS has been received of the death of Dr. Wilmanns who was imprisoned and dismissed from the chair of psychiatry at the University of Heidelberg, by a Gauleiter's decree based on shorthand notes taken by informers during his lectures. He had courageously warned his students against the dangers of mass hysteria and the leadership of psychopathic fanatics and criminals in politics. A member of a Hanseatic merchant family, Wilmanns was highly critical and unbending in what he held to be right.

His most important contributions to his own specialty were in social and forensic psychiatry, and his earliest work, on the psychology of tramps, vagrants, and casual labourers, established the frequency of psychiatric illness among this group. It was the first of a series of monographs on social and mental-health problems, and Wilmanns continued to study his subjects on the spot—in the workhouse, or in the Bavarian hopfields. "His proposals for coping with the antisocial psychopath, published in 1927, are probably," writes W. M.-G., "the most balanced, practical, and farsighted ever made, and still deserve the attention of the student of penal reform. His subtle scholarly mind and urbane personality made Wilmanns a stimulating teacher, though he modestly protested against being regarded as the equal of Griesinger, Kraepelin, or Nissl who preceded him in his chair. Together with the group of workers whom he had easily attracted to his clinic, he contributed much to the development of research and learning in psychiatry, and he lived to see the soldiers of the New World restore academic freedom to his university."

THE offices of the British Hospitals Association are now at 52, Green Street, London, W.1, to which address the Central Bureau of Hospital Information and the *Hospitals Year-book* have also moved.

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Notes and News

MEDICAL SCIENCE AND PHYSICAL EDUCATION

THE annual general meeting of the Research Board for the Correlation of Medical Science and Physical Education was held in London on Jan. 16. Dr. FRANK HOWITT, the chairman, said that the three-part report on medical science and physical education in relation to maternity and child welfare, education, and the Services, which had already appeared, was incomplete without the fourth part, now published, on the relation of medical science and physical education to industry. This, he said, emphasised that experience gained during the war should not be lost: experiments in job-analysis, vocational guidance, the provision of canteens and hostels, physical development centres, rehabilitation, and resettlement must be adapted to civilian use. The board was to remain in existence as an advisory body. The report of an inquiry into the criteria of physique among age-groups of youths would shortly be published.

Sir ALFRED WEBB-JOHNSON, F.R.C.S., said the board had been prospectors for health. He agreed that use should be made of the instructors in physical education who had had valuable experience in the Services.

Mr. ANEURIN BEVAN, Minister of Health, expressed his regret that in the forthcoming Health Services Bill the industrial medical services would not be integrated. These would have to be regarded separately and later assembled into the health structure as a whole.

Sir REGINALD WATSON-JONES, F.R.C.S., indicated the excellent final results of present-day surgery. In the Royal Air Force over 90% of men with broken backs had been restored to full citizenship, and over 80% to their former duties. This was attributable not only to improved surgical technique, but also to planned rehabilitation and resettlement, whereby treatment was continued to its logical conclusion. The process had been developed during the last five years in military medicine, and was applicable to civilian practice. Where there was a residual disability, the Disabled Persons Employment Act now ensured employment by right instead of by charity. Coupled with this was the Industrial Injuries Insurance Act, which would solve many difficulties; but the inequity of awarding 50*s*. a week for an industrial disability, and only 20*s*. to 30*s*. for a non-industrial disability, should be removed.

Brigadier F. A. E. CREW, F.R.C.P., F.R.S., said that the industrial subcommittee, of which he is chairman, supported the raising of the school-leaving age as a biological consideration arising from the increased expectation of life. He called for better liaison between school and industry, with the provision of vocational guidance. Much disability and inefficiency could be traced to unsuitable employment. Job-analysis and personnel selection should be developed in the choice of work for adults, as had been done in the Services. Industrial medical officers should be trained in the techniques of group investigation, and should be encouraged to engage in research.

A MEDICAL VETERAN

Dr. Joan Lamplugh, a Birmingham graduate who has spent her professional life among the lepers around the shores of Lake Bangweolo, Northern Rhodesia, sends this biographical note on her colleague Adrian Ackman Adrian, an African doctor now about 80, who has recently been decorated by the Tanganyika government for 54 years of service.

Barefoot, with white beard all curls, its silver in striking contrast with his sable face, with his cream coat, blue breeches, and red fez he is a picturesque figure. Seized by Touareg marauders in his native village on the Niger near Timbuctoo, his captors sold him for a slab of salt to an Arab who led him prisoner a long desert journey without food or water. Later he was ransomed by a missionary who took him to Carthage, where he was educated under the watchful eyes of Lavigerie. He was always head of his class, and it was not long before he became a medical student in Malta University. Having graduated in medicine and been equipped with a medical trousseau, he returned to Africa, the caravan taking over a year to reach its destination. He vividly remembers this awful journey in a slave caravan, his unhappy patients filthy, starved, brutally treated, and covered with sores, many dying on the way. He did what he could while under fire from slave-traders, crawling out to the sick with food and water, and comforting the dying. During his 54 years in Tanganyika, Dr. Adrian included among his patients Bwaa Motomoto, king of the brigands, who had four or five attacks of blackwater fever. Thirty years ago the district around the great lake of Tanganyika was devoid of children, owing to venereal disease. Now, thanks largely to Dr. Adrian's preventive and therapeutic work, it swarms with healthy piccaninnies.

Though small, Dr. Adrian is sturdy, often carrying the sick on his back. His knowledge of medicine is accurate and kept up to date by the refresher courses across the Congo which he attends whenever possible. He is married and has one grown-up son; his house is the local orphanage. With an income of £2 a month he manages to support the orphans until they can support themselves. Living as the natives do, he can be out all night on a case and yet first out in the village in the morning.

NATURAL HISTORY OF SPEECH

AT a meeting of the Royal Anthropological Institute on Jan. 15 Dr. Leopold Stein, speech therapist to the Tavistock Clinic, put forward a theory of the development of speech which could be applied to the treatment of speech disorders. He suggested that Java man (pithecanthropus) and Peking man (sinanthropus) made crude noises, not amounting to speech, which came from two sources: respiratory tract and alimentary tract. The respiratory noises were of three kinds: aspirated, soft, and hard or glottal (sighs and groans). The hard or glottal sound appeared first with the assumption of the erect attitude and the concomitant descent of the larynx and the development of the epiglottis (from a mere aid to smell) into a protective device for the larynx. Sounds produced in the alimentary canal were caused by suction and rarefaction of air in the mouth; apes had a few such sounds, and human babes had many. These suction sounds were called clicks and varied according to the position of the tip of the tongue against different parts of the palate. In babies clicks were erotic expressions of the babe's enjoyment of the mother, and as such were always rhythmical. Clicks were an important component of several primitive languages; nor were they absent from civilised languages (an example being the English expression of disgust, "chut-chut").

Turning from pithecanthropus and sinanthropus in Asia to western Europe, Dr. Stein suggested that Chellean man had got as far as what might be termed articulate speech, which consisted of single but repeated syllables composed of a combination of a sigh or groan (respiratory sound) and a click, corresponding to the stage of a baby's "speech" when it can say "gug-gug." Such reduplicated syllables were characteristic of many primitive languages today and played a part in classical Greek, especially in the formation of past tenses of verbs. According to this theory, the syllables of Chellean man were still those which a baby produces by suction while entirely dependent on its mother. This was in accord with the fact that although Chellean man made rudimentary tools, he was still inferior in strength to the wild beasts round him and sought strength by coöperation with, and therefore dependence on, others of his kind. But in the following Acheulean and Moustierian cultures, when tools were more advanced, man was becoming superior to his hostile surroundings, was becoming independent, and therefore not only made sucking ("taking in") sounds but also developed the other consonants ("giving out" sounds). This stage was paralleled by the babbling stage in the baby. Thus the development of speech in a baby was the recapitulation of the development of speech in the human race.

Dr. Stein realised that the first criticism of his theory would be that it was merely fanciful, but he claimed that it was supported by evidence to be found in disorders of speech (stammering, dysphasia, dyslalia), in which the pattern outlined above reappeared according to the stage of dissolution reached. In his view it was of no avail to attempt to re-educate speech by phonetic instruction, but it was possible to do so by making the patient relive the natural history of speech—i.e., click, groan, sigh, and later babbling.

SMOKE CONTROL

THE National Smoke Abatement Society in a booklet recently produced for distribution to local authorities presses for closer attention to the prevention of smoke rather than to the mitigation of the nuisance after it has arisen. It is proposed that all fuel-burning plants should be approved before installation. Local authorities should, it is suggested, set an example by ensuring that all their own premises are rendered smokeless. The larger local authorities are advised to seek powers to establish smokeless zones, as the city corporations of London and Manchester are now doing.

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University of Oxford

In congregations held on Dec. 15 and 22, the following degrees were conferred :—

D.M.—G. R. Girdlestone.
M.Ch.—B. B. Hickey.
B.M., B.Ch.—Ronald Ruddock-West, L. D. Hamilton, Roger Gillett, H. A. K. Rowland, Matthias Paneth, John Towers, G. M. Woodman, Aleida E. M. M. R. Bisschop, Pamela F. M. Causer, Barbara J. Nathan, Esme H. Hadfield, Hilary J. E. Allen, Elizabeth Radovitch, Leila M. Taylor, and Helen M. Wagstaffe.

The Osler memorial medal was presented to Dr. C. G. Douglas, F.R.S.

During Hilary term, 1946, Prof. E. D. Adrian, O.M., will give six lectures on Fridays at 5 P.M. in the hall of Magdalen College entitled the Physical Background of Perception: the Brain and its Sense Organs. The first lecture will be given on Friday, Feb. 1.

University of Cambridge

During December the title of the degrees of M.B., B.CHIR. was conferred on C. E. Cooper of Girton.

Society of Apothecaries of London

At a meeting of the court of assistants held on Jan. 18, with Dr. Hugh F. Powell, the master, in the chair, Dr. J. P. Hedley was appointed representative on the General Medical Council. The following were admitted to the freedom of the society: by redemption, Sir Lionel Whitby, John Llywellyn Penistan, Elston Grey Turner, Robert Hayward Bailey, Lionel Edward Close Norbury, and Daniel Thomas Davies; by servitude, Henry Yellowlees, David Watkinson, and John Sumner Stead; by patrimony, John Chaliè Skrine Ainley-Walker. The honorary diploma of mastery of midwifery was granted to Mr. Arthur C. H. Bell, late examiner.

The diploma of L.M.S.S.A. was granted upon examination to the following :—

G. C. Mayer, B. Dawes, C. J. W. Soutar, T. J. Thompson, M. W. Johnston, D. Wimborne, J. C. Matthews, R. G. C. Jones, I. H. Mercer, F. J. Offord, R. A. Wilkinson, R. C. Jennings, D. D. Forbes, B. H. Pickard, P. J. Roden, J. Flinter, R. J. C. Hutchinson, and R. Clitherow.

Women's Hospitals to Amalgamate

The Hospital for Women, Soho Square, London, and the Samaritan Free Hospital for Women, Marylebone, have been amalgamated. The combined institutions propose to build a new hospital with 400–500 beds at a cost of about £1,000,000.

Return to Practice

The Central Medical War Committee announces that the following have resumed civilian practice :—

Miss DOROTHY J. COLLIER, F.R.C.S., 5, Upper Wimpole Street, W.1.
Mr. H. D. BROWN KELLY, F.R.F.P.S., 16, Park Circus, Glasgow, C.3.
Mr. THOMAS MOORE, M.S., F.R.C.S., 14, St. John Street, Manchester.
Mr. C. NAUNTON MORGAN, F.R.C.S., 149, Harley Street, W.1.
Mr. D. F. ELLISON NASH, F.R.C.S., 25, Park Crescent, Portland Place, W.1.
Dr. K. SHIRLEY SMITH, F.R.C.P., 99, Harley Street, W.1.
Mr. PHILIP WILES, F.R.C.S., Middlesex Hospital, W.1.
Dr. L. H. J. W. WORTH, 10, Devonshire Place, W.1.

L.C.C. Hospitals Exhibition

Opening the hospitals exhibition at County Hall on Jan. 21, the Minister of Health, Mr. Aneurin Bevan, said that L.C.C. hospitals, which accommodated 68,000 patients, needed a further 3000 nurses and 1600 domestic workers. He attributed the present shortage of hospitals and nurses largely to increased readiness to enter hospital. Wages and conditions had been greatly improved in the nursing profession, which now, he said, provides an attractive career. The exhibition will remain open till Jan. 26.

Unrra's Dental Work

For more than two years UNRRA has operated a dental service for displaced persons in Palestine and Egypt. Six months ago this service was extended to Europe. In Germany the organisation has made itself responsible for the dental care of about a million displaced persons. Extractions, permanent fillings, replacement of essential teeth, and treatment of oral diseases are undertaken. Six UNRRA dental administrators, under the direction of Dr. Davidson Bell, are assisted by displaced persons with dental experience, and, where these are not available, by German personnel. A hundred complete dental units have already been sent to Greece, and more are to follow. Six scholarships have been obtained for postgraduate work by Greek dentists in Great Britain and the United States; and it is hoped that a similar scheme will be extended to other countries where UNRRA operates. Lieut.-Col. G. A. Nevitt, UNRRA's dental consultant in London, will shortly visit Poland to lecture and advise.

Medical Diary

Jan. 27 to Feb. 2

Monday

ROYAL SOCIETY OF MEDICINE, 1, Wimpole Street, W.1
5 P.M. *Odontology.* Dr. A. B. MacGregor: Arterial Supply of the Mandible. Dr. David Stewart and Dr. W. Lewinsky: Innervation of the Epithelium of the Gum.

Tuesday

UNIVERSITY OF LONDON
5.15 P.M. (University College, Gower Street, W.C.1.) Mr. F. Bergel, PH.D.: Symptomatic Drugs—Synthetic Analgesics and Antispasmodics. (Third of five lectures.)
ROYAL SOCIETY OF MEDICINE
5 P.M. *Medicine and Surgery.* Dr. Maurice Shaw, Mr. A. J. Gardham, Dr. G. T. Calthrop: Chronic Cholecystitis.
MEDICAL SOCIETY OF LONDON, 11, Chandos Street, W.1
5.30 P.M. Prof. G. Grey Turner: Œsophagus. (Lectures for demobilised medical officers.)

Thursday

ROYAL COLLEGE OF SURGEONS, Lincoln's Inn Fields, W.C.2
5 P.M. Mr. S. H. Wass: Odontomes and other Affections of the Jaws. (Hunterian lecture.)
ROYAL SOCIETY OF MEDICINE
8 P.M. *Urology.* Mr. Terence Millin: Retropubic Prostatectomy.
MIDDLESEX COUNTY MEDICAL SOCIETY
2.30 P.M. (Kodak Works, Wealdstone, Harrow.) Paper and film.
ASSOCIATION FOR SCIENTIFIC PHOTOGRAPHY
6.30 P.M. (Caxton Hall, Westminster, S.W.1.) Mr. H. T. F. Rhodes, M.I.E.I.: Forensic Photography.

Friday

ROYAL SOCIETY OF MEDICINE
10.30 A.M. *Otology.* Mr. W. I. Daggett, Mr. G. Chubb, Air Commodore E. D. D. Dickson: War Deafness and the Care of Deafened ex-Service Men.
2.30 P.M. *Laryngology.* Cases.
5.30 P.M. *Anæsthetics.* Dr. H. K. Ashworth, Dr. T. A. B. Harris, Dr. R. E. Pleasance, Dr. V. A. Goldman, Dr. Bernard Johnson: Anæsthesia in Tropical Climates.
MEDICAL SOCIETY OF LONDON
5.30 P.M. Dr. Wilfrid Oakley: Diabetes. (Lectures for demobilised medical officers.)

Appointments

BUTLER, R. D. WEEDEN, B.A. Camb., M.R.C.S., D.O.M.S.: ophthalmic surgeon, Birmingham Maternity Hospital.
DAVIDSON, SAMUEL, A. F. C., M.B. Edin., F.R.C.O.G.: obstetric surgeon, Birmingham Maternity Hospital.
FRIZELLE, E. R., M.CH. Belf., F.R.C.S.E.: surgeon, Leicester Royal Infirmary.
GRIFFITHS, H. J., M.R.C.S.: temp. asst. M.O.H. (school medical dept.), Kingston-on-Hull.
PENMAN, A. H., M.B. Durh.: examining factory surgeon for Malmesbury, Wilts.
SAWYER, G. C., M.S. Lond., F.R.C.S.: asst. surgeon, Leicester Royal Infirmary.
Radcliffe Infirmary, Oxford—
GILL, W. G., M.CHIR. Camb., F.R.C.S.: temp. asst. surgeon.
HUGHES, J., F.R.C.S.: temp. part-time asst. surgeon.
MOLONEY, G. E., M.B. N.Z., M.R.C.P., F.R.C.S.E.: surgical tutor.

Births, Marriages, and Deaths

BIRTHS

DODDS.—On Jan. 7, at Masham, Yorks, the wife of Dr. G. R. Dodds—a daughter.
HUNT.—On Jan. 16, the wife of Dr. B. W. Hunt—a son.
LEWIS.—On Jan. 5, at Cardiff, the wife of Dr. C. W. D. Lewis—a son.
MILLER.—On Jan. 10, in London, the wife of Lieut.-Colonel H. R. Miller, R.A.M.C.—a son.
ROGERS.—On Jan. 13, at Woking, the wife of Surgeon Lieutenant Watson Rogers, R.N.V.R.—a son.
SCOTT.—On Jan. 15, at Tonbridge, the wife of Dr. L. T. Scott—a son.
SMITH.—On Dec. 31, in Alexandria, Egypt, the wife of Lieut.-Colonel M. L. Smith, M.C., I.M.S.—a daughter.
STREET.—On Jan. 14, in London, the wife of Captain E. W. Street R.A.M.C.—a son.

MARRIAGES

HUNT—PHILLIPS.—On Jan. 14, in Bournemouth, Reginald H. Hunt, O.B.E., major R.A.M.C., to Joan M. Phillips, W.R.N.S.
NEWTON—TOWNSHEND.—On Jan. 15, at Stone, Staffs, Dudley Newton, squadron-leader R.A.F.V.R., to Petrie Townshend M.R.C.S.

DEATHS

BOWN.—On Jan. 12, Arthur Thomas Bown, M.R.C.S., lieut.-colonel I.M.S. retd., aged 85.
EDDOWES.—On Jan. 15, at Woodford Green, Alfred Eddowes, M.D. Edin., M.R.C.P., aged 95.
HALL.—On Jan. 15, at Chudleigh, Devon, John Falconer Hall, C.M.G., M.B. Aberd., K.H.S., surgeon rear-admiral.
VAN PRAAGH.—On Jan. 15, in London, Harold John Van Praagh, M.D. Lond., aged 68.
WHELTON.—On Jan. 12, Michael James Whelton, M.D. N.U.I., colonel R.A.M.C.

CORRIGENDUM.—In Professor McCance's paper of Jan. 19, p. 78, table I, the figures for riboflavine and nicotinic acid should be expressed in μg. per g.

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THE CARE OF THE AGED

OBSERVATIONS BASED ON EXPERIENCE IN GLASGOW OUTDOOR MEDICAL SERVICE

M. CURRAN, M.B. Glasg., D.P.H.
J. HAMILTON, M.B. Glasg.
J. S. ORR, M.B. Glasg.
W. POOLE, M.B. Glasg.
E. N. THOMSON, M.B. Glasg.

DISTRICT MEDICAL OFFICERS FOR THE CITY OF GLASGOW

OLD age has become a problem of national importance. In 1921 the number of people in this country over the age of 65 years was roughly 5¾ million; in 1931, 7½ million; in 1936, 8¾ million; while the total population of these years was 42,769,196 in 1921, 44,790,485 in 1931, and 45,805,000 in 1936 (estimated). Since the care of the aged forms a considerable part of our work, we are in a particularly favourable position to investigate and procure data about the living conditions of these old people. The following is our contribution to what is a vital aspect of social medicine.

The majority of the people investigated were on or near poor-law level, living for the most part in densely populated tenement areas adjacent to the industrial concerns in which they had previously been employed. Five average working-class districts were selected, including wards 4, 6, 7, 9, 10, 19, 20, 21, 22, 23, and 24 of the city. An idea of the housing conditions in these wards is afforded by the fact that 29·5% of the 199,990 "fit" houses in them are overcrowded, while there are in actual occupation 1302 "unfit" houses.

The total number of old people investigated was 1001, comprising 273 males over 65 years and 728 females over 60 years, which are the generally accepted pensionable ages. Each individual was visited by the doctor in his or her home in order that accurate information would be obtained about domestic conditions.

Only 184 males and 15 females claimed the right to medical benefit under National Health Insurance. This may at first seem surprising but many old people are under the impression that when they reach pensionable age they are no longer entitled to medicine and attention under N.H.I. auspices; and there is a tendency in some quarters on the part of those responsible to avoid this obligation as people approach these ages. Judging by the number of insured persons who apply for dental and other benefits to the welfare department, it would seem that few of the insured persons receive any of the additional benefits so widely advertised by approved societies. Excessive prescribing is a constant thorn in the flesh of the panel doctor. The result is that the welfare department is saddled with responsibilities which are in the first instance within the province of the N.H.I.

THE SUPPLEMENTARY PENSION

The numerous amending Acts which have been passed since the Poor Law Act of 1845 have led to a multiplicity of authorities controlling the welfare of the aged person. This has already been recognised and the National Council of Social Service has helped considerably by the publication of their pamphlet, *Notes for Old Age Pensioners*, which explains very simply the various benefits to which pensioners are entitled. In our opinion the functions of all these authorities should be combined in one body. We feel, however, that it is not inappropriate to compare one aspect of the Assistance Board, which is a national organisation, with the corresponding aspect of the public-assistance or welfare department, which is municipal.

The former in an endeavour to retain the self-respect of the recipients usually makes all its provisions in cash. The additional payments at the most amount to only a few shillings a week, and considering that the basic allowance is a bare minimum these additional payments tend to be regarded as part of the weekly budget and are not saved and utilised as intended. If a dependant of the board requires new clothing the sum of 1s. or 1s. 6d. is added to each weekly payment until a sum sufficient to buy the clothing has been received. This is such a small addition to the weekly income that the recipient is tempted to spend it on food or other immediate needs; so the purchase of the clothing becomes impossible. On the other hand the local authority grants these necessities in kind, and considering the advantages of mass buying, together with the fact that the "parish suit" is no longer self-evident, the result is a somewhat higher standard of personal comfort for the poor people of employable age.

There seems to be no reason why the latter method should not be applied to old people and our experience leads us to think it is the better. Since the Old Age and Widows Pensions Act, 1940, part II, section 10 (4) specifically states that "the administration of supplementary pensions shall be conducted in such a manner as may best promote the welfare of pensioners," we fail to see why it cannot be adopted. In addition, the official outlook expects Assistance Board officers to "make a proper use of the board's discretionary powers to adjust a supplementary pension to meet special circumstances or to *make grants for exceptional needs*."

WIDOWS IN THE MAJORITY

In scrutinising the figures of those married, single, and widowed, the most remarkable feature is the high percentage of widows:

	Males	*Females*	*Total*
Married	143	153	296
Single	35	68	103
Widowed	95	507	602

While this is in part explained by the difference between 60 and 65 years of age it does not by any means explain why the number of widows should be five times the number of widowers. Nutritional anæmia as a cause of earlier death in the male living alone cannot play any great part in the discrepancy. McIntosh and Morris [1] show that in people living alone the hæmoglobin level was satisfactory in both sexes; but, while the work of women of this class is usually dull, monotonous, and uninteresting, most men of the class have been employed in the heavy industries. It is probable that the wear and tear of their work has contributed to their earlier deaths. Vital statistics also show that women generally live longer than men; so when all facts are considered the preponderance of widows is not so astonishing.

It is natural that at these ages the majority should be the tenants of their houses, though a fair proportion have become lodgers, usually with their relatives, while a small number have sought refuge in common lodging-houses. Of those living alone, 36 are males and 243 females, which bears out what was found in a survey of East London in 1929–30—"More old women than old men (both in number and proportion) live solitary lives, as is to be expected, as the women would as a rule be better able than the men to manage for themselves." [2]

TABLE I—CONJUGAL CONDITION

	Married	*Single*	*Widow(er)*	*Total*
Tenant	275	57	437	769
Lodger	21	33	138	192
Inmate of common lodging-house	—	13	27	40
Living alone	10	26	243	279

In analysing the conjugal condition of these people (table I), it is found that there are 26 bachelors or spinsters

1. McIntosh, J., Morris, N. *Glasg. med. J.* 1941, 136, 103.
2. New Survey of London Life and Labour, 1932, vol. iii.

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and 243 widowed persons living alone. This means that a quarter of this section of the population lead solitary lives and do not require large houses. They would be happier in homes of one or two apartments with modern conveniences, provided that this did not involve change of locality. On the other hand, grouping them in "blocks of flats for old people" would be a social error. They would lose the brightness which is brought into their lives by associating with younger generations; and young people would lose the softening influence called forth in the consideration usually shown to age. Of the 192 who are in lodgings no less than 138 are widowed and probably were in previous years tenants of their houses. They are now resident mostly with relatives for economic and/or physical reasons. Against this, 437 widowed have succeeded in maintaining their independence and still retain the tenancy of their homes.

LIVING CONDITIONS

The condition of these homes has been studied and an attempt made at classification. The first thing was to decide on a definition of a satisfactory house and in this paper by a satisfactory house is meant one having reasonable living-space and cleanliness and sufficient furniture, water, light, heat, and warmth with weatherproof walls and a w.c. within or adjacent. In assessing the condition of a house we have taken into account only the interior and have ignored the outward appearance, the approaches, and the immediate surroundings, many of which were not satisfactory from either a health or an æsthetic standpoint. Such surroundings would not be endured by the investigators, nor by a younger generation; but if the previous history of the old people is taken into consideration we feel justified in classing 925 of their houses as satisfactory. Economic factors, together with infirmities of age, have blunted their perception towards the general comforts of life and have unfortunately led to their acceptance of their present state. It must not be overlooked, however, that had these poor people in their earlier years been accustomed to a higher standard of living they would not now consider their present surroundings tolerable.

It is interesting to compare the proportion of houses found satisfactory in this survey with the description given of five boroughs of East London where the houses are described as "the least pleasing part of the picture. Though some are quite good, nearly one-third of those visited are described as dark, dilapidated, damp or leaky."[2] Also that this type of house is acceptable to the majority is borne out by the large number (645) who express themselves as unwilling to leave their present homes for any others. They have passed from the temerity of youth, through the disillusionment of middle age to the timidity of old age and are now afraid to tackle life in new surroundings; they have about them friends and neighbours they have known for many years.

Personal cleanliness would be greatly improved by the provision of baths in all houses although in these tenement areas of Glasgow, it is surprising to find a third of them with baths and roughly half with inside lavatories:

			Total
Houses with bath ..	110 ..	229 ..	339
Lavatory inside	161 ..	357 ..	518

Any scheme formulated for the provision of individual homes for old people must include an inside lavatory and bath in each house. The type of bath should be the short three-quarter-length bath, such as is provided in Crookston Homes, Renfrewshire, with two fixed handles to aid the old person to get in and out. The outside lavatory is a legacy of the past, and to the elderly is particularly dangerous in cold weather, as well as being objectionable at all times.

Of the old people 669 have a bed each. Of these, 279 live alone; so 390 have the sole occupancy of a bed in houses with other residents. This seems strange in areas which are notoriously overcrowded, but it must be remembered that when the old person is not just fit the rest of the family crush into more overcrowded conditions to make him or her more comfortable. In addition many old people have been persuaded to give up their own houses to live with relatives on the understanding that they would be provided with a bed to themselves. It seems strange also that, apart from the 279 living alone, 359 had a room to themselves; but the same explanation holds good—the rest of the family crowd into other rooms to leave the old people in comfort.

TABLE II—AGED PERSONS CASE-RECORD

Dependency	Family at hand		Family not at hand		No family	Total
	Interested	Not interested	Interested	Not interested		
Self-reliant ..	182	13	38	64	42	339
Dependent on relatives only ..	270	2	4	7	11	294
Dependent on neighbours only	5	4	12	54	17	92
Dependent on husband or wife	44	2	6	16	7	75
Others*	136	6	29	21	9	201

* Combination of neighbours, relatives, and district nurse.

Table II is self-explanatory, but is important in that for the first time there is given statistical proof of what has long been known to social workers—namely, that of the aged poor 1 in every 10 depends on the charity and goodwill of neighbours who are on a similar social level and who can have no expectation of material reward for their services. Despite their reliance on what is casual assistance, the old people prefer to remain outside institutions, avoiding rules and regulations and preserving their own individuality.

The small number in the column Family at Hand but Not Interested demonstrates that poverty does not destroy the bonds of British family life. It would be illuminating to investigate this reaction in the higher levels of society. Of those in the survey, many (339) are self-reliant, and of these a fair proportion could still be of productive use to the community.

The mode of life of these people is dictated by physical condition. Those who were able to get about and fend for themselves numbered 408, while there were 286 who were bedridden and entirely dependent on others for their care. Many, however, although not fit to care for themselves were nevertheless up and about, trying to be independent: these numbered 307.

AILMENTS

Among the many physical disabilities from which these old people suffer the most prevalent and incapacitating, though not necessarily the most dangerous, is the group generally labelled "rheumatism." Under this heading are included all types of muscle and joint pains. An attempt was made to classify broadly the various ailments encountered and the results are contained in table III.

TABLE III—INCIDENCE OF AILMENT

Disease	*Males*	*Females*	*Total*
A. None	11 ..	18 ..	29
B. Cardiovascular	23 ..	67 ..	90
C. Pulmonary	3 ..	28 ..	31
D. "Rheumatism" ..	42 ..	133 ..	175
E. Blindness	1 ..	3 ..	4
F. Others	31 ..	87 ..	118

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But many people suffered from a combination of these diseases, the commonest being shown in table IV.

TABLE IV—CASES WITH MORE THAN ONE AILMENT

Disease groups	M.	F.	Total	Disease groups	M.	F.	Total
BD ..	46	92	138	DB ..	6	17	23
BF ..	12	22	34	FB ..	3	20	23
CB ..	14	34	48	FD ..	25	61	86
CD ..	19	48	67	CBD ..	10	15	25

The prevalence of "rheumatism," remarked on previously, was often accompanied by a tendency to stoutness, especially among the women. Moving about the house, cleaning, scrubbing, and washing becomes in these circumstances a matter for serious thought. They are unable to keep either themselves or their homes scrupulously clean, but eventually arrive at a compromise which leaves things "comfortably" clean and not unpleasant to themselves or their visitors. The tendency to stoutness is by no means due to overfeeding but is the result of many factors. Mental and physical changes following the climacteric, the drab surroundings in which they live, the realisation that they will never rise above these surroundings because of their advancing years, and the loss of a woman's natural interest in her appearance—all these factors make them indifferent to the gradual increase of weight and the disappearance of their womanly attractions.

Our figures for rheumatism seem to be in agreement with those of Davidson and Duthie [3] whose investigation was carried out in an agricultural community of insured persons. Our investigation, of course, was in an industrial community embracing only those of pensionable age. Our cases were all of the non-articular and articular types as classified in the report of the Medical Advisory Committee (Scotland), 1945, and again our results bear out the findings of this committee and agree that the incidence of rheumatism increases with age.

As is to be expected, the next highest disease group is that of the cardiovascular system. Increasing age, work, injudicious feeding—the lot of the city-dweller—these factors would seem to account for this. Those suffering from pulmonary lesions form a relatively small group considering that they have spent most of their lives in smoky damp ill-ventilated parts of the city; and the number of those without obvious disease is gratifyingly large.

Table V shows the various diseases classified in age-groups.

TABLE V—CLASSIFICATION ACCORDING TO DISEASE, AGE, AND SEX

Disease	MALES						FEMALES						
	-70	-75	-80	-85	Over 85	Total	-65	-70	-75	-80	-85	Over 85	Total
None	3	5	3	—	—	11	4	5	5	—	5	—	19
Cardiovascular	27	25	24	9	1	86	38	60	58	28	20	5	209
Pulmonary	27	10	9	1	—	47	27	30	34	25	13	5	134
"Rheumatism" ..	26	17	9	5	—	57	35	53	43	27	19	2	179
Blindness	2	3	1	1	—	7	1	4	1	1	3	—	10
Others	27	19	14	5	—	65	39	57	35	23	17	6	177
Totals	112	79	60	21	1	273	144	209	176	104	77	18	728

PHYSICAL COMFORTS

By "adequate" bedding is meant that the bed and its coverings were such that the investigators could see no ill effects resulting from their lack; nor did the patient complain about coldness. This, of course, means a minimum of physical comfort below which the bedding was classified as inadequate. With regard to household and nursing utensils, adequacy means the minimum for cooking and cleaning for one person. Special nursing requisites, such as bedpans, are supplied to these people by the welfare committee.

It was indeed pleasing to find that even after five years of war-time scarcity, preceded by years of unemployment and existence on the "dole," these old people had during their previous working years invested in bedclothing and household furnishings to such a degree that these articles continued in use until now and could even yet be classed as adequate. Very few were noted as inadequate in bedding and household and nursing utensils, although through constant wear all textile furnishings were becoming noticeably threadbare. In 769 cases bedding, household utensils, and nursing utensils were regarded as adequate; in 130 nursing utensils were inadequate, but bedding and household utensils satisfactory; while in 48 bedding, household utensils, and nursing utensils were all alike unsatisfactory.

INDEPENDENCE AND SELF-SUPPORT

Until now the tendency has been to tell old people how they ought to live; we suggest that their wishes should be considered. The majority (644) want to stay in their present homes. Is there any reason why this desire should not be gratified? Is it not possible to make their present homes more habitable while new homes for the next generation of old people are being built among the new housing estates? We agree entirely with Emily D. Samson in *Old Age in the New World* when she pleads for compulsion on local authorities to include in their post-war housing schemes plans for small dwellings for old couples and for solitary old people in the proportion of not less than 10–15% of the total number of dwellings according to local need.

Segregation of the aged is to be avoided. The presence of old people scattered about a community tends to exert an unseen unrealised restraint on the excessive exuberance of youth, while the young people automatically gravitate to the old for advice in moments of difficulty. Old people, if their companions are of similar age, become crotchety and critical of their neighbours. The presence of younger people, especially those two generations removed from them, has a considerably brightening effect on the aged: the granny who looks after the infant while the mother is out of the house relieves the mother of anxiety and feels proud of her position, at the same time serving a very useful purpose.

The war has proved that old people, previously thrown on the scrap-heap, are quite capable of continuing at some kind of productive work and anxious to do so. The Papworth Settlement has shown how people, young but physically unfit, can become self-supporting and independent of charity. It is surely not beyond the resources of our magnificent country to provide productive work for the old but comparatively fit. In addition, since the old will form an increasing proportion of the population, the results of their labours, while not at the same level as those of the younger generation, must help to maintain the economic level of the country as a whole. Can

3. Davidson, L. S. P., Duthie, J. J. R. Reports on Chronic Rheumatic Disease, no. 4, 1938.

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we afford to do without the productive power of the old in view of the trend of the population towards age?

The old people are not able to maintain a rigid time-table of work, but the revival of the system of home crafts which was submerged in the industrial revolution could be attempted with advantage; for example, the old lady who is quite capable of doing a fair amount of knitting and the old man who is handy with tools and can make toys.

The loss of interest in life generally because the world has lost interest in them has had a demoralising effect on the old. The knowledge that they are at least helping to pay their way, that they are really needed by the country, and that they are not a drain on the pockets of other people, would restore their self-respect and help to postpone their physical and mental disintegration, while the novelty of their new occupation, coming at what they expected to be the dreary terminal period of their lives, would brighten their later years. It is common knowledge that death comes surprisingly early to many newly retired people: how much of this acceleration is due to sudden loss of employment and the ensuing feeling of uselessness? We found 408 of our 1001 cases were quite fit to care for themselves: practically all of them would be capable of performing some kind of home industry.

The practice of home crafts must of course be entirely voluntary, and the sympathetic guidance of trained and understanding social workers must be relied on to a very great extent to make such a plan a complete success. The social worker must treat these people as independent individuals and not as recipients of "honeyed charity." Since the passing of the Disabled Persons Employment Act, 1944, the Ministry of Labour have trained and replaced in industry a wide variety of disabled persons. Could not a similar idea be adopted for old people?

REMOVAL FROM HOME

The fear of institutions which still savour of the poor-law is a constant cloud over the heads of the aged; the regimentation and the loss of individuality associated with large institutions, so familiar in the novels of Dickens, is to the old people an actuality. Only 51 out of our survey agreed voluntarily that they might consider going to a home, although the picture painted of the home was rather idealistic.

When eventually the old person becomes incapable of self-care, some voluntary system of help must be brought into action. No system of paid help is equal in efficiency to the voluntary efforts of those who regard the care of others as part of their vocation in life, and those present organisations which care for the aged should receive an abundance of help; the State could assist by relieving such organisations of tax burdens.

TABLE VI—AGED PERSONS CASE-RECORD

Physical condition	Willing to leave present habitation to live—			Total
	in home	in hospital	with relatives	
Able to care for self ..	32	28	3	63
Unable to care for self, but up	17	61	2	80
Confined to bed	2	212	—	214
Total	51	301	5	357

	Males	*Females*	*Total*
Requiring hospitalisation ..	114 ..	197 ..	311

But not all infirm old people or chronic sick require removal to hospital; we considered that 311 required hospitalisation and that 301 of the 357 willing to leave their present habitation would agree to go to hospital (table VI). Some of these and many others could possibly continue comfortably in their own homes were some type of help available; many could be looked after by carefully chosen, well-trained, sympathetic home-helps who look with interest on this type of work. These home-helps could, with advantage, be the outdoor staff of the institutions which will admit the old people when they are no longer suitable for home nursing. Many such homes are already doing good work but the number of people cared for is only about 5000. In *Old Age in the New World* it is stated that "in general they accommodate only a small number so that a home-like atmosphere is possible. The religious background is undoubtedly a great comfort to many of these old people who are approaching the end of their lives."

Medical attention should be entirely free and in the hands of middle-aged practitioners who have some understanding of and sympathy with the difficulties of the aged person. Every suggestion of charity must be avoided and the old person must realise that this service is his by right.

CONCLUSION

We have given here some data about 1001 old people living in the community. We feel that with only a little effort something more could be done to make the evening of their lives more comfortable, happier, and less lonely. Such an effort could be engrossingly interesting.

Our thanks are due to Sir Alexander Macgregor, medical officer of health of the City, and to Prof. T. Ferguson of Glasgow University, for help and guidance; and to Miss Kay of the health department for statistical help in the preparation of this report.

DUST IN SURGICAL THEATRES
AS A POSSIBLE SOURCE OF POSTOPERATIVE TETANUS

D. T. ROBINSON
M.R.C.S., M.Sc. Manc.
BACTERIOLOGIST, CITY OF LIVERPOOL; ASSOCIATE PROFESSOR OF BACTERIOLOGY, UNIVERSITY OF LIVERPOOL

J. W. McLEOD
M.B. Glasg., F.R.S.
BROTHERTON PROFESSOR OF BACTERIOLOGY, UNIVERSITY OF LEEDS

A. W. DOWNIE
M.D., D.Sc. Aberd.
PROFESSOR OF BACTERIOLOGY, UNIVERSITY OF LIVERPOOL

TETANUS following surgical operations is relatively rare, although in civilian practice almost 10% of over 3000 cases reviewed by Wainwright (1926) were postoperative. It is usually impossible to prove the source of infection in these cases, although various materials have been incriminated on circumstantial evidence. Catgut has often been blamed, and occasionally the evidence for this has been strong (Mackie 1928). Imperfectly sterilised dressings and instruments, the skin at operation site, and sulphonamide powders have also come under suspicion. Toxigenic tetanus bacilli have been found in human fæces by various observers, although the incidence of this apparently varies in different countries and different communities, and the intestinal tract of the patient has therefore been regarded as the source of infection in abdominal or gynæcological operations (Tulloch 1919).

Tetanus bacilli are often present in soil and street dust from which wounds due to accidents may become infected. Dust in hospital wards or operating-theatres has not often been seriously considered as a possible source of tetanus infection of operation wounds, but the observations made in relation to the two cases reported below indicate that this possible source should not be overlooked.

CASE 1

A woman, aged 29, undergoing sanatorium treatment for tuberculosis, had an operation on March 6 for right extrapleural pneumothorax, and had extrapleural refills on the

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9th, 10th, and 13th. On the 13th the inner end of the wound began to discharge, and on the 15th she developed symptoms of tetanus from which, despite the most energetic antitoxic therapy, she died two days later. At the autopsy, done 18 hours after death, the edges of the operation wound showed signs of septic infection, and the right thoracic cavity contained a large quantity of bloodstained purulent fluid. There was also a small amount on the left side. The site of the operation wound was excised, and specimens of pus and heart blood were taken for investigation.

Tissue at the edge of the wound was pared away and ground up with sand in a mortar with sterile precautions. Three-quarters of the pulped mass was inoculated liberally into six previously boiled screw-capped bottles of cooked-meat medium. Two of these were immediately heated at 80° C for 10 min., two at 70° C for 30 min., and two were not heated. The caps were screwed down firmly, and all the bottles were incubated aerobically for four days at 37° C. The remaining quarter of the tissue mass was extracted with broth; half of the extract was heated at 80° C for 10 min., the other half not being heated. Animal inoculation tests were carried out, and both of these extracts gave negative results.

Examination of the cultures showed the presence of various clostridia, including morphologically typical sporing tetanus bacilli in all except one of the unheated meat cultures. By Fildes' technique, using slopes of Fildes' medium, chocolate-agar, and serum-agar, pure cultures of morphologically and culturally typical tetanus bacilli were isolated. Four-day cultures in broth produced typical signs of tetanus in mice and guineapigs and had no effect on antitoxin-protected controls.

Cultures made from the edges of the wound, the thoracic pus, and the heart blood showed the presence of *Staphylococcus aureus*. No tetanus bacilli were cultured from the thoracic pus.

Inquiries Bearing on the Source of Infection.—In searching for possible sources of infection in this case, the possibility of some breakdown in aseptic technique was first considered. The steriliser was tested and found to be efficient. Samples of all kinds of sterilised dressings and other materials, such as talc and saline, which were used at the operation were examined and proved sterile. The actual catgut used at the operation was, of course, unobtainable, but samples from every batch (seven in all) which were available were sterile. The manufacturers of the catgut stated that no complaints had been received from other users of the same batches.

Besides these orthodox inquiries it was thought desirable to explore the possibility of the infection being dust-borne. This was suggested by the situation of the operating-theatre with windows opening on to grazing-pastures. Accordingly 24 hours after the autopsy samples of "dust" were collected on sterile swabs from the floor of the operating-theatre, from the wall behind a steam radiator, from the shade of the lamp over the operating-table, and from the blades and vent of a ventilating fan situated in the wall near the ceiling. These samples were examined by the same technique as before.

From three of them—swabbings from the floor, wall, and fan—typical toxigenic tetanus bacilli were isolated in pure culture. Two weeks later an entirely independent survey of the same operating-theatre, which had undergone careful disinfection in the meantime, was made by one of us. Swabbings were again taken from the floor, the top of the radiator close to the window, and the ventilating-fan shaft. No tetanus bacilli were recovered from any of these swabs on this occasion. A sterilised open jar was then placed on the outer side of the window and left there to collect dust. The examination of this dust also proved negative for tetanus bacilli. Finally an examination was made of dust from a path just outside the operating-theatre and from the soil of the field which lay beyond the boundary hedge of the institution but within 10 yards of the theatre. The material from the path gave a negative result, but that from the field yielded typical toxigenic tetanus bacilli, which were isolated with unusual ease.

In view of these results the investigation was extended to the surgical theatres of a Midland city remote from the hospital where this catastrophe had happened. Four theatres were examined in all: the main operating-theatre of the voluntary hospital, the main operating-theatre and an emergency theatre in the municipal hospital, and the only theatre of the fever hospital. All these examinations gave negative results. There was only one of these theatres, however, which appeared to be completely protected from airborne dust. This was the main theatre suite of the municipal hospital, which was ventilated entirely by air which had passed through an elaborate filtering system. It therefore seemed of interest to investigate the soil in the vicinity of the windows of the various theatres.

Typical toxigenic tetanus bacilli were recovered in waste ground in the vicinity of the windows of the voluntary hospital and from a flower-bed near the windows of the emergency theatre of the municipal hospital. The observations on these two soils were repeated many months later and confirmed. The soil from the flower-beds of the fever hospital gave a negative result.

The isolation of the tetanus bacilli in the soils from the grounds of the city hospitals was considerably more difficult than in that from the field near the hospital in which the case of postoperative tetanus had occurred, and they were presumably therefore much less numerous. An exact quantitative estimate of the numbers of tetanus spores present was not attempted, however.

CASE 2

Five days after operation for hæmorrhoids an English seaman, aged 38, developed symptoms of tetanus. In spite of large doses of antitoxic serum given intravenously symptoms of generalised tetanus developed, and the patient died five days after the first appearance of symptoms.

The day after death pieces of the rectum with the operation site were removed for bacteriological examination. There was a good deal of necrosis at the site of the operation wound in the rectal mucosa and round the stumps of the ligated hæmorrhoids. Tissue from the operation wound and mucosa of the rectum above and below were removed and ground up separately with crushed glass in sterile mortars. The three lots of ground tissue were added to screw-capped bottles of cooked-meat media, which were then heated to 70° C for 20 min. and incubated aerobically for four days. At the end of this time all three cultures showed typical morphological sporing tetanus bacilli, which in each instance were recovered in pure culture by repeated use of Fildes' technique with slopes of heated blood-agar, Lœffler serum-slopes, or slopes of Fildes' agar. The cultures were typical; one was tested by animal inoculation and produced typical fatal tetanus in inoculated guineapigs, whereas control animals given antitoxin before inoculation of the cultures suffered no ill effects.

Further Observations.—After operation a soft-paraffin gauze pack had been placed on the operation site. The soft-paraffin gauze had been sterilised, with other dressings and swabs used in the theatre, in a large hospital autoclave of modern type. When tested later with a sample of street dust and pieces of lint which had been soiled with cultures of three strains of aerobic spore-bearing bacilli the steriliser proved to be efficient. Saline used in the theatre was also found to be sterile. The batch of catgut used (no. 4) was no longer available for examination. The manufacturers of the gut stated that all the batches of catgut used in the theatre about this time had proved to be sterile on test. The talc used as dusting powder for the rubber gloves in the hospital was subjected to dry heat before it was sent to the theatres. A sample so treated yielded a mixed growth of clostridia on anaerobic culture, but *Cl. tetani* was not recovered. The mixed culture did not kill mice within a week after intramuscular injection. In view of the observations made in case 1, samples of dust were collected on four sterile cotton-wool swabs moistened

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with broth from the floor of the theatre in which the operation had been performed. These samples were taken eleven days after the operation—i.e., two days after the patient died. The dust-soiled cotton-wool was removed from the swabs and cultured in the same way as the rectal tissues obtained post mortem. From three of the swabs tetanus bacilli were isolated in pure culture. The only one of the three cultures tested produced typical tetanic death in a guineapig after intramuscular injection, whereas a control antitoxin-protected animal remained well.

As noted above, the intestinal tract has often been suggested as a possible source of infection in post-operative tetanus. Examination was not made of the rectal or colonic contents in this case. It was considered that, even if *Cl. tetani* had been recovered from these situations, it would have been impossible to say whether the operation wound or the intestinal contents had first harboured the organism.

In view of the finding of toxigenic tetanus bacilli in the floor dust of the operating-theatres where the two cases had been treated further observations were made in other hospitals. In the hospital where case 2 had been a patient and in two other hospitals in the vicinity samples of dust were collected from the floors of all the operating-theatres in use—a total of eleven. The specimens were cultured by the technique previously outlined. Clostridia were present in the cultures from all specimens, and several showed clostridia with terminal round or oval spores. The initial mixed cultures were tested for toxicity in mice, with control mice protected with tetanus antitoxin in each case.

An attempt was also made to isolate tetanus bacilli from the original mixed cultures by means of Fildes' technique. From only one specimen were toxigenic tetanus bacilli recovered, and the pure culture and the original meat culture from which it was derived produced typical tetanus in mice. This specimen of dust had been obtained from an operating-theatre next door to that in which case 2 had had his operation and was collected thirty-four days after the patient's death. At this time tetanus bacilli were not recovered from the theatre where they had been found the day after the autopsy on case 2 had been made.

DISCUSSION

Though the observations in case 1 do not prove that infected dust in the operating-theatre was the source of the tetanus bacilli, no other probable source was discovered. There was no reason to suspect the catgut or dressings. In at least three reported cases (Carbone and Perrero 1895, Motzfeldt 1912, and Wright 1930) tetanus apparently originated from lesions in the bronchi or the lungs, and the bacilli were believed to have gained entrance to the tissues from the air passages. There was no evidence that such was the route of infection in case 1, for tetanus bacilli were readily isolated from the wound in the chest wall but were not obtained from the pus in the thoracic cavity.

In case 2 the origin of the tetanus bacilli found post mortem at the operation site is more problematical. Most cases of postoperative tetanus in Wainwright's series of 365 followed abdominal or gynæcological operations, and many have considered that the intestinal tract has been the source of infection in such cases, although evidence of such an origin has usually been lacking. The incidence of tetanus bacilli in the fæces of healthy persons in this country is low (Fildes 1929, Kerrin 1928), and it is perhaps worthy of note that in many of the cases considered by Wainwright tetanus followed an operation which did not involve the intestinal tract (abdominal hysterectomy in 29, oöphorectomy in 78, and inguinal hernia in 38 cases), while a smaller proportion followed operations on the gastro-intestinal tract (69 cases, including 23 for hæmorrhoids). Imperfectly sterilised obstetrical and gynæcological dressings have been considered a possible cause of the relatively high incidence of tetanus following operations on the female genital tract (Pulvertaft 1937). Inquiries about the possibilities of infection from catgut or dressings afforded no evidence incriminating these materials.

However, in view of the observations reported above, dust in the operating-theatre must be considered as a likely source of infection in case 1 and a possible source of infection in case 2, and steps should be taken to exclude so far as possible infected dust from operating-theatres. This would involve, among other measures, the wet dusting of operating-theatre floors and walls with antiseptic solutions, the filtering of the air coming into the theatre through ventilating shafts, and precautions against the introduction of infected dust on the footwear of theatre personnel. This last measure might be effected by insisting that at some point in the corridor sufficiently remote from the theatre everyone entering should put on gum-boots or some equivalent which had been left standing in a potent antiseptic solution.

SUMMARY

The bacteriological observations made in relation to two cases of postoperative tetanus suggest that infected dust in the operating-theatre was in one case the probable and in the other a possible source of infection of the operation wounds. Measures should be taken to exclude infected dust from operating-theatres.

REFERENCES

Carbone, T., Perrero, E. (1895) *G. Accad. med. Torino*, **43**, 593, translation in *Zbl. Bakt.* **18**, 193.
Fildes, P. (1929) A System of Bacteriology in Relation to Medicine, vol. iii, p. 322.
Kerrin, J. C. (1928) *Brit. J. exp. Path.* **9**, 69.
Mackie, T. J. (1928) An Enquiry into Postoperative Tetanus. Report to the Scottish Board of Health. Edinburgh.
Motzfeldt, K. (1912) *Zbl. Bakt.* **65**, 60.
Pulvertaft, R. J. V. (1937) *Brit. med. J.* i, 441.
Tulloch, W. J. (1919) *J. Hyg., Camb.* **18**, 103.
Wainwright, J. M. (1926) *Arch. Surg., Chicago*, **12**, 1062.
Wright, H. D. (1930) *Univ. Coll. Hosp. Mag.* **15**, 64.

DETERMINATION OF BLOOD-GROUPS

USE OF RABBIT IMMUNE SERUM

S. G. RAINSFORD
M.D., D.Sc. Dubl., D.P.H.
SURGEON CAPTAIN, ROYAL NAVY

W. T. J. MORGAN
Ph.D., D.Sc. Lond. and Zürich, F.R.I.C.
READER IN BIOCHEMISTRY IN THE UNIVERSITY OF LONDON

From the Lister Institute of Preventive Medicine, London

THE transfusion of casualties in the firing-line, whether on sea or land, has through force of circumstances to depend entirely on the use of blood belonging to group O, the so-called universal-donor group. In the Army blood is forwarded and distributed to the front line from bases in the rear, and the employment of air transport has made it possible for the bases, where the blood can be selected by skilled technicians working in fully equipped laboratories, to be remote from the site of conflict. Naval vessels, on the other hand, cannot be supplied in this manner, and if whole blood is urgently required a donor must be obtained from the crew, typed and bled on board. Each ship cannot contain a skilled laboratory technician and in most instances does not contain a person with any experience of blood-grouping. It has always been the policy of the Royal Navy, however, to make each ship a self-contained unit where possible, and ships carrying a medical officer are supplied with equipment for blood-grouping and for the collection of whole blood and administration of blood or plasma.

The difficulty of obtaining on board ship donors belonging to known groups has been to some extent

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alleviated since the R.N. Blood-Transfusion Service has bled and typed approximately 10% of the personnel of the whole Navy and has given special instruction in all matters pertaining to blood-transfusion to many of the medical officers. One of the duties of the R.N. Blood-Transfusion Service, in conjunction with the Galton Laboratory Serum Unit, has been to select from the bloods collected from R.N. personnel serum of a titre suitable for use as a reagent for blood-group determinations. The examination of 4032 bloods belonging to groups A and B obtained in 4 months showed that only a very small proportion of the sera were of sufficiently high titre (over 256) to be of use as blood-grouping reagents. Indeed only 1 person in 60 belonging to group A and 1 person in 14 belonging to group B yielded a serum suitable for use as reference standard for the detection of B and A groups respectively. Experience has shown that not more than 200 ml. of serum is obtained from one donor at a single bleeding, and it may be calculated that to keep the Navy supplied with grouping sera will entail access to a very large panel of donors, which may be impossible in peace-time.

The reactivity of many of the sera at present supplied for blood-grouping is satisfactory when rapidity of examination is not of primary importance, and when the complete technique recommended by the Medical Research Council (1943) is carried out. This procedure entails the examination of the agglutinogen of the donor's cells and the agglutinins in the donor's serum and involves the use of cells of known blood-group. In most instances, however, a detailed examination of this kind is not practicable on board ship. It was therefore felt that, besides issuing human anti-A and anti-B agglutinins separately, the rapid selection of group-O donors to supply blood for emergency transfusions at sea would be made easier if a reagent containing both agglutinins was available. The difficulty of supplying such a reagent by mixing anti-A and anti-B serum from human sources is due not only to the reduction of iso-agglutinin titre by simple dilution on mixing but also to the fact that in most human sera there is some agglutinogen corresponding to that present in the cells of the blood from which the serum was obtained (Schiff 1924); the agglutinogens neutralise the homologous iso-agglutinins (Aubert et al. 1942) and thus reduce still further the anti-A and anti-B titre of the reagent. These difficulties are to some extent obviated if the serum from an O blood is used; but it has been found that, although sera from O donors often show higher anti-A and anti-B titres than are found in the sera of A and B bloods, they are not in most instances sufficiently potent to be suitable for use as blood-grouping reagents.

The collection of blood by the R.N. Blood-Transfusion Service is largely from ungrouped donors. This is intentional, because the object is to determine the group of as many of the naval personnel as possible besides maintaining a stock of fresh group-O blood and collecting serum for drying. The donor's blood-group is determined at the time of bleeding, so that the group-O donors can be detected and bled into citrate. In order that the blood-group can be determined as rapidly as possible the blood-grouping reagents are carefully selected for their speed and intensity of reaction. The difficulty of obtaining sufficient human serum of the required potency and avidity for such reagents to be issued, however, forced us to consider the use of rabbit immune sera. The work of Morgan (1943, 1944) and of Morgan and Watkins (1944, 1945) on the production and properties of potent anti-A agglutinins in rabbits suggested that, if a similar serum specific for the detection of B-erythrocytes could be produced, a mixed immune rabbit serum containing these two agglutinins might be a reliable blood-grouping reagent for the rapid detection of group-O donors. The present paper describes the investigations carried out by the R.N. Blood-Transfusion Service with rabbit anti-A and anti-B immune sera.

EXPERIMENTAL

Technique of Grouping.—A sample of a donor's blood diluted in 1% citrate in physiological saline solution was examined on a tile just before a full pint of blood was taken. Two drops of the donor's blood suitably diluted were placed separately on a tile and mixed with an equal volume of anti-A serum or with anti-B serum. The degree of agglutination was read macroscopically after 15 min. Suspensions giving a negative reading after this time were examined microscopically, and those bloods showing no agglutination were regarded as belonging to group O.

A sample of blood to yield cells and serum for subsequent examination in the laboratory was collected from each donor at the time of the main bleeding. These samples were examined by skilled technicians using a tube technique which differed only slightly from that described by the Medical Research Council (1943). The accuracy obtained is similar to that found by Taylor et al. (1942a), as will be seen by comparing the general distribution of the blood-groups in 57,011 donors examined in our investigations (table I) with those

TABLE I—COMPARISON OF DISTRIBUTION OF BLOOD-GROUPS

Blood-group	Naval personnel typed by R.N. Blood-Transfusion Service		Persons typed by Galton Laboratory serum unit	
	No.	%	No.	%
O	26,380	46·28	7321	45·82
A	23,982	42·07	6746	42·23
B	4866	8·53	1397	8·74
AB	1783	3·12	513	3·21
Total	57,011	..	15,977	..

recorded for 15,977 persons tested by them. There was complete qualitative agreement between the results obtained with the human and rabbit sera. The tests were carried out for 6 months, during which time the rabbit serum was kept frozen solid at a temperature of — 15° C and showed no loss of specificity or potency. One advantage which the rabbit serum had over the human serum—i.e., that at the dilution used it is a clear colourless reagent—was recognised by the blood-grouping personnel early in the investigation. Human serum at the dilution used, on the other hand, is usually coloured, which renders the rapid reading of its reactions without the aid of a microscope less definite.

Observations were made also on the speed of agglutination with different dilutions of the rabbit immune serum and a 1 : 2 dilution of the corresponding human serum. The tests were made on a tile by placing one drop of cells from a standard pipette, which delivered 20 drops per ml., in the well of a tile and adding one drop of serum from another standard pipette to the cells. Each serum was tested at the same time against the same cell suspension on one tile. In this way all mixtures were subjected to the same amount of shaking. Agglutination was considered complete when all cells were clumped into one solid mass and the surrounding fluid was clear. The human serum used neat gave a less definite end-point than the diluted rabbit serum, owing partly to the intrinsic yellow colour of the human serum at a dilution of 1 : 2. Therefore, to control the reactions obtained with the 1 : 2 dilution of human serum one drop of undiluted serum was placed in a dimple and one drop of the diluting fluid used in making the cell suspension added to it. A complete agglutination with the human serum was considered to have taken place when the cells were formed into a homogeneous mass in the centre of the tile while the surrounding fluid resembled in colour and transparency that of the control.

PREPARATION AND USE OF ANTI-A RABBIT SERUM

Rabbits were immunised with an artificial antigenic complex made from purified human A-substance in accordance with the technique described by Morgan (1943) and by Morgan and Watkins (1944).

Immune sera with an agglutination titre of 1 : 32,000 or above for A_1 and A_2 cells were pooled, and after heating

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at 56° C for half an hour were absorbed separately with samples of stromata prepared from pooled cells obtained from 10 donors from each of the groups B and O. One absorption was made at 4° C to remove cold agglutinins. The serum was then filtered twice through asbestos pads and bottled. The titre of the pooled absorbed serum for cells of different phenotype was as follows: A_1 and A_2, 20,000; A_2B, 10,000; B, 16; O, nil. There was a drop in the titre during absorption for all types of A cells, the A_2 titre being reduced rather more than that for A_1 cells. It was observed that a considerable part of the reduction in the agglutinins took place after the serum had been absorbed with O stromata only and before absorption with B stromata.

The rabbit serum showed a number of different properties from those shown by human anti-A serum. It reacted most strongly with A_1 cells at 37° C, as shown by the titration results (table II). Further, the titre for A_2B cells was only very slightly lower than that for A_1 cells. Human anti-A serum normally reacts much less intensely with A_2B cells than with A_1 cells (Taylor et al. 1940), and a typical specimen of human serum used as a "standard" blood-grouping reagent gave the following agglutination titres with cells of known phenotype: A_1 and A_2, 512; and A_2B, 128. In this instance the titre for A_2B shows about a quarter only of the titre given against A_1 cells, and indeed many samples of human anti-A serum have a titre for A_2B cells which is only an eighth or less of that given by A_1 cells.

To test the specificity of the rabbit anti-A serum, it was titrated in parallel with the human anti-A serum, the titres of which for all types of cells was as shown above. The tests were carried out with the tube technique, and bloods, partially selected and containing 3863 group O, 2194 group A, 119 group A_1B, and 49 A_2B bloods, were examined. The human serum was used at a dilution of 1 : 4 and the rabbit serum at a dilution of 1 : 200. At these dilutions the potency of the human serum, as expressed by the agglutination titre, was slightly greater than that of the rabbit serum for A_1 and A_2 cells but considerably weaker for A_2B cells. There was complete qualitative agreement between the results obtained with the human and rabbit sera. The numbers of complete and visual reactions obtained with both sera were about equal, although it might have been expected that the human serum would have given less definite results with the A_2B cells than did the rabbit serum. This difference was not observed, however, probably because the reactions given by both sera were so strong.

TABLE II—TITRATION OF RABBIT ANTI-A SERUM AT DIFFERENT TEMPERATURES USING ONE VOLUME OF SERUM DILUTION AND ONE VOLUME OF CELL SUSPENSION IN EACH TUBE

Serum dilution	Room temp. (15° C)			37° C			4° C		
	A_1 cells	B cells	O cells	A_1 cells	B cells	O cells	A_1 cells	B cells	O cells
1/1	c	+++	–	c	++	–	c	v	–
1/2	c	+	–	c	+	–	c	v	–
1/4	c	w	–	c	*w*	–	c	+	–
1/8	c	*w*	–	c	–	–	c	w	–
1/16	c	–	–	c	–	–	c	w	–
1/32	c	–	–	c	–	–	c	–	–
1/64	c	–	–	c	–	–	c	–	–
1/128	c	–	–	c	–	–	c	–	–
1/256	v	–	–	c	–	–	v	–	–
1/512	v	–	–	c	–	–	v	–	–
1/1024	v	..	..	c	..	..	v	..	..
1/2048	v	..	..	v	..	..	++	..	..
1/4096	++	..	..	v	..	..	+	..	..
1/8192	+	..	..	v	..	..	w	..	..
1/16384	+	..	..	++	..	..	w	..	..
1/32768	±	..	..	+	..	..	w	..	..
1/65536	±	..	..	+	..	..	–	..	..

c = complete agglutination, v = visual, ++ = agglutination in smaller clumps, w = weak agglutination, *w* = very *weak* agglutination (3–4 cells), – = no agglutination.

TABLE III—TIME IN WHICH RABBIT ANTI-A AGGLUTININ AND HUMAN ANTI-A ISO-AGGLUTININ AGGLUTINATE CELLS OF DIFFERENT PHENOTYPES

Agglutinin	Serum dilution	Reaction time to give complete agglutination with test cells				
		A_1	A_2	A_2B	B	O
		min. sec.	min. sec.	min. sec.		
Human anti-A	1/2	4 50	7 19	16 32†	0	0
Rabbit anti-A	1/20	4 50	..	..	v. weak	0
	1/40	4 47	..	..	0	0
	1/80*	4 9	6 52	7 11	0	0
	1/100	4 27	8 1	7 43	0	0
	1/200	6 29	9 39	14 55	0	0
	1/400	7 11	..	..	0	0
Titres of undiluted sera:						
Human serum		512	512	128	..	..
Rabbit anti-A serum		10,000	10,000	5000	16	..

* These results seem to indicate that there is a tendency for this high-titre serum to show a zone of inhibition. This was not apparent in the tube tests.
† Clumping equal to that of 1/100 rabbit serum, but supernatant fluid never cleared completely.

Experiments were also made to determine the rapidity with which the human and rabbit sera agglutinated cells containing the A agglutinogen. The results of the experiments (table III) show that the rabbit anti-A serum, although 20 times stronger than the human serum for A_1 and A_2 cells, agglutinated these more rapidly after it had been diluted 80-fold than did the human anti-A serum at a dilution of 1 : 2. Further, although the titre of the rabbit agglutinin for A_2B was about 40 times greater than the human anti-A serum, it agglutinated these cells more quickly and completely when diluted up to 200 times.

Similar observations have been made with other human and rabbit anti-A sera which appear to indicate that the immune rabbit agglutinin differs in avidity from that of the normal anti-A iso-agglutinins found in human blood. The avidity of an agglutinating serum—i.e., the power of the antibody to form, quickly and completely, tightly packed masses of agglutinated cells—is worthy of more consideration than it has received in the past, for it is of paramount importance where the tile method of testing has to be relied on, as on board ship, or whenever transfusions of fresh blood have to be made in an emergency. The avidity is an important factor in this method of testing, for the contact between the antigen and the antibody is perforce limited because of the rapid and significant evaporation that takes place, especially in dry hot climates, from the large surface area of the mixed cell suspension and agglutinin solution. For this reason alone the more rapidly and completely an agglutination reaction takes place the more reliable is the determination of the group of the blood under examination.

MIXED RABBIT ANTI-A AND HUMAN ANTI-B SERUM

During the early part of the investigation, and before a suitable anti-B rabbit immune serum had been produced, a mixed reagent was prepared from anti-A rabbit serum and human anti-B agglutinin.

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An immune anti-A rabbit serum was absorbed with O stromata and yielded a serum giving the following agglutination titres: test cells, A_1 and A_2, 32,000; B, 2048; O, nil. The serum was mixed with human anti-B serum, 0·25 ml. of the rabbit anti-A serum being added to 10 ml. of the human anti-B serum, to form approximately a 1 : 40 dilution of the rabbit serum in human anti-B serum. The mixture gave the following agglutination titres: test cells, A_1 and A_2, 512; A_2B, 1024; B, 512; O, nil. The titre of the serum for A_1 cells was rather less than expected, and the loss of potency, other than that arising from simple dilution, was probably due to the presence of A agglutinogen in the human anti-B serum which combined with part of the anti-A agglutinin.

The mixed serum agglutinated all types of cells other than O within 5 minutes. The reagent was issued to a bleeding-team and used by them for separating the O donors from the other members of the ABO group. It was used in the same manner as described for the teams that used human serum, except that it was only necessary for them to test one drop of cell suspension with one drop of this serum. The results obtained by the same team using the mixed serum and human anti-A and anti-B serum separately are shown in tables IV and V. The total errors in grouping were less when the combined serum was employed. The reduction in errors is chiefly due to a smaller number of positive samples being incorrectly returned as negative, which, from a practical point of view, is the really important fact. Further, the results were obtained by skilled and experienced technicians. The significance of these observations is reinforced when comparative figures for the use of the combined serum by relatively unskilled people under the conditions of special emergency which followed D-day are considered. The figures showing the total number of errors in grouping donors made by two experienced teams and those of an inexperienced team are shown in table VI. The error made by all teams using the combined serum is about a third of that of a skilled team using human anti-A and anti-B serum separately.

TABLE IV—GROUPING FIGURES SHOWING ERRORS MADE BY THE TEAM USING HUMAN ANTI-A AND HUMAN ANTI-B SERUM SEPARATELY

As determined in the laboratory by tube technique:

O	A	B	AB	Total
443 (44·3%)*	438 (43·8%)	90 (9%)	29 (2·9%)	1000

Number of errors		Team finding	Correct group
1	11 false negatives	O	A_2
7		O	A_1
3		O	B
2	3 false positives	A	O
1		B	O

Total 14 (1·4%)

Bank Error: 451 pints received, of which 11 were not group O, making a bank error of 2·4%.

* Some O donors from this group of donors had already been extracted locally.

TABLE V—GROUPING FIGURES SHOWING ERRORS MADE BY THE TEAM USING RABBIT ANTI-A SERUM MIXED WITH HUMAN ANTI-B SERUM

As determined in the laboratory by tube technique:

O	A	B	AB	Total
1435 (47·8%)	1222 (40·7%)	252 (8·4%)	91 (3·0%)	3000

Number of errors		Team finding	Correct group
2	9 false negatives	O	A_2
7		O	A_1
8	false positives	A, B, or AB	O

Total 17 (0·57%)

Bank error: 1436 pints received, of which 9 were not group O, making a bank error of 0·63%.

TABLE VI—COMPARATIVE FIGURES SHOWING GROUPING ERRORS OF EXPERIENCED AND INEXPERIENCED TEAMS USING VARIOUS SERA UNDER EMERGENCY CONDITIONS

Sera	Team	No. of bloods received as group O	Errors (false negative reactions)	Group of error *			
				A_1	A_2	B	AB
Human anti-A and human anti-B separately	Exp.	451	11 (2·4%)	7	1	3	0
Rabbit anti-A and human anti-B mixed	Exp.	1436	9 (0·63%)	7	2	0	0
	Exp.	4248	36 (0·85%)	27	6	2	1
	Inexp.	1041	9 (0·85%)	7	2	0	0
Rabbit anti-A and rabbit anti-B mixed	Exp.	961	3 (0·31%)	3	0	0	0
Totals		8137	68	51	11	5	1
				62			

* As determined in the laboratory by the tube technique.
Inexp. = inexperienced.

PREPARATION OF RABBIT ANTI-B SERUM

The specific blood-group B substance was obtained from pseudomucinous ovarian cysts (Morgan and van Heyningen 1944). A detailed description of the isolation and properties of the B substance will be given elsewhere. It was converted into a full antigen by combination with the conjugated protein component of the O-somatic antigen of *Bact. shigæ* by the method already described for the preparation of an artificial A antigen by Morgan (1943) and by Morgan and Watkins (1944). Rabbits were given serial (usually 6) doses each of 0·1 mg. or 1·0 mg. of the artificial complex and were bled 7–9 days after the last dose. The titre for B cells of one preparation of anti-B serum after absorption with A and O cells was 5000; against A cells the preparation did not react at a dilution greater than 1 : 8.

TABLE VII—TIME REQUIRED BY RABBIT ANTI-B SERUM FOR THE AGGLUTINATION OF B AND A_2B CELLS COMPARED WITH THAT REQUIRED BY A HUMAN ANTI-B SERUM

Serum	Dilution	B cells	A_2B cells
		min. sec.	min. sec.
Human anti-B	1/2	6 30	5 55
Rabbit anti-B	1/5	3 20	3 20
	1/10	3 30	3 40
	1/20	4 40	4 10
	1/40	5 35	5 0
	1/80	7 10	7 0

Titres of the undiluted sera with	A_1 cells	B cells	A_2B cells
Human anti-B	0 ..	512 ..	512
Rabbit anti-B	8 ..	5000 ..	5000

Bloods to the number of 1093 were tested in duplicate by the tube method using the rabbit anti-B serum at a dilution of 1 : 25 and a human anti-B serum (titre 512) at a dilution of 1 : 4. The bloods examined were in part selected and belonged to the following groups: O, 365; A, 586; B, 106; A_1B, 25; and A_2B, 11. There was complete agreement between the results obtained with rabbit serum and those with human serum, but more complete reactions were recorded with the rabbit serum.

The rabbit serum was tested on tiles in parallel with a human anti-B serum to determine the speed of reaction of the two reagents. The results of the tests (table VII) show that, although the rabbit anti-B serum has a titre about 10 times that of the human anti-B serum, it agglutinates both B and A_2B cells more rapidly at a dilution of 1 : 40. The rabbit anti-B serum is more reactive

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and shows greater avidity than the human anti-B agglutinin.

PREPARATION AND USE OF MIXED RABBIT ANTI-A AND ANTI-B SERUM

Rabbit anti-A and rabbit anti-B sera, after absorption with O cells, were mixed, 1 part of anti-A being added to 3 parts of anti-B. The agglutination titres of the mixed sera against cells of known phenotype were as follows: A_1 and A_2, 5000; A_2B, 10,000; B, 5000; O, nil.

The combined serum was tested on tiles and compared with human anti-A and anti-B sera. The results (table VIII) show that, although the anti-A and anti-B

TABLE VIII—SPEED AT WHICH MIXED RABBIT ANTI-A AND RABBIT ANTI-B SERUM AGGLUTINATED A AND B CELLS COMPARED WITH HUMAN SERA

Serum	Dilution	A_1 cells	A_2 cells	A_2B cells	B cells
		min. sec.	min. sec.	min. sec.	min. sec.
Human anti-A No. 1	1/2	5 55	10 27	13 17	0
Human anti-A No. 2	1/2	6 7	11 9	19 22	0
Human anti-A No. 3	1/2	4 50	7 19	16 32	0
Human anti-B	1/2	0	0	5 55	6 30
Rabbit anti-A + rabbit anti-B mixed	1/2	2 17	2 45	1 53	3 48
	1/20	3 5	4 11	3 3	5 39
	1/40	3 10	5 11	3 4	5 50
	1/80	6 7	10 15	6 32	10 43
Titres of undiluted sera—					
Human anti-A, Nos. 1, 2, 3	..	512	512	250	0
Human anti-B	..	0	0	512	512
Rabbit anti-A and rabbit anti-B mixed		5000	5000	10,000	5000

titres of the mixed rabbit serum are about 10 times greater than those of the human anti-A and anti-B serum, it will, when diluted 1 : 40, agglutinate A and B cells more quickly than does either of the human sera. The extraordinarily rapid action of the mixed rabbit reagent on the A_2B cells is understandable, for both agglutinogens are present in the test cells and are acted on by both agglutinins. The more rapid action of the rabbit serum on A_1, A_2, and B cells is presumably due to its greater avidity.

The combined rabbit serum, in 0·5 ml. amounts, was dried in ampoules from the frozen state and was reconstituted when required by adding 5 ml. of physiological saline—i.e., it was diluted 1 : 10. The mixed reagent was used by a team for testing 2071 donors using the tile technique. The results were analysed and checked in the laboratory and the findings are shown below:

Test cells ..	O	A	B	AB	Total
No. of donors	958	880	170	63	2071
	(46·25%)	(42·5%)	(8·2%)	(3·0%)	

The total errors made by the team using the mixed anti-A and anti-B reagent were as follows: no group-O bloods were reported as A, B, or AB; 3 bloods which were subsequently shown to belong to group A_1 were incorrectly returned as belonging to group O. The total errors were, therefore, 3 (0·14%) of all bloods examined. The blood bank received 961 pints of blood marked group O, of which 3 were really group A. Bank error was, therefore, 0·31% expressed in terms of the number of O bloods.

DISCUSSION

The investigations have been undertaken to determine whether specific blood-grouping sera produced in rabbits are of sufficiently high titre and avidity to make them suitable for use as routine reagents in place of human anti-A and anti-B agglutinins. The results of an examination of immune anti-A and anti-B rabbit sera, induced by artificial antigens built up from A and B specific substances of human origin, show that such sera can be readily produced, and, on the assumption that about 60 ml. of anti-A serum of suitable potency (titre 25,000) can be obtained from one rabbit, one animal will yield sufficient anti-A agglutinin to make 3 litres of a blood-grouping reagent of acceptable potency (over 256) and avidity. To obtain an amount of blood-grouping reagent of similar potency from human sources would necessitate the examination of and selection from about 2400 persons. When the experiments here described were carried out the position with regard to a supply of potent anti-B serum from rabbits was not so satisfactory. More recent work on the isolation and purification of the B specific substance has enabled a better antigen to be produced, and more potent anti-B rabbit sera than those described in this paper are now obtainable (Morgan and Waddell, unpublished observations).

Comparative figures for the selection of group-O donors by teams using 3 different mixed anti-A and anti-B reagents (table VI) show that, under the special conditions of emergency which existed during most of the investigation, the mixed anti-A and anti-B rabbit reagent reduced the error made in the selection of group-O donors by the use of human anti-A and anti-B sera separately to about an eighth (0·31%) of its previous figure (2·4%). In most tests the mixed rabbit serum was employed at a dilution at which its content of anti-A and anti-B agglutinin, measured by simple end-point titration, did not differ significantly from that of the human iso-agglutinins used in the test.

Table VI shows that of 8137 bloods returned by the teams as group O there were 68 errors, of which 62 belonged to group A and 5 only to group B. The significantly low number of group-B errors appears to indicate that B cells are more agglutinable than A cells. This conclusion seems to hold irrespective of whether the A cells belong to the sub-groups A_1 or A_2, since the number of A_2 bloods returned in error as O bloods in relation to the number of A_1 bloods so returned—i.e., 11 to 51—is not significantly greater than the normal ratio (1 : 4) found in the population (Taylor et al. 1942b). If this conclusion is correct, it seems desirable, for the preparation of a combined testing reagent using anti-A and anti-B immune sera at present available, that the potency of the anti-A agglutinin should be made greater than that of the anti-B component. The results so far obtained indicate that the average titre with A cells of the anti-A sera produced in rabbits is considerably higher than that reached by rabbit anti-B sera for B cells.

Most of the observations recorded in this paper were made under conditions which were to some extent peculiar to the Royal Navy, and it must be emphasised that the main duty of the teams, when the experimental work described was carried out, was to examine and bleed the largest possible number of R.N. personnel rather than to perform controlled experiments to determine the relative merits of the two types of test reagents. These experiments, however, were made whenever circumstances permitted, and the results were checked by subsequent laboratory examination. It is from the data given in the mass records of the bleeding-teams that we have attempted to compare the results obtained with the mixed rabbit anti-A and anti-B reagent with those recorded for the human anti-A and anti-B sera.

SUMMARY

Anti-A and anti-B sera produced by immunising rabbits with artificial antigens built up from A and B substances of human origin are suitable for use as blood-grouping reagents.

The use of mixed anti-A and anti-B rabbit immune sera of high titre and avidity reduces the errors of blood-grouping when O donors are to be selected rapidly from a group of untyped persons, and thus the mixed serum

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should prove of value in making more reliable in an emergency the selection of blood for immediate transfusion.

We wish to thank Sick Berth Petty Officer K. J. Parry, Leading Sick Berth Attendant J. A. J. Seaman, and Miss W. M. Watkins, who assisted us in the laboratory work entailed in these investigations.

REFERENCES

Aubert, E. F., Boorman, K. E., Dodd, B. E. (1942) *J. Path. Bact.* **54**, 89.
Medical Research Council (1943) War Memo. no. 9.
Morgan, W. T. J. (1943) *Brit. J. exp. Path.* **24**, 41; (1944) *Brit. med. Bull.* **2**, 175.
— van Heyningen, R. (1944) *Brit. J. exp. Path.* **25**, 5.
— Watkins, W. M. (1944) *Ibid*, **25**, 221; (1945) *Ibid*, **26**, 247.
Schiff, F. (1924) *Klin. Wschr.* **3**, 679.
Taylor, G. L., Race, R. R., Prior, A. M. (1940) *Brit. med. J.* **i**, 297.
— — — Ikin, E. W. (1942a) *J. Path. Bact.* **54**, 81; (1942b) *Ibid*, p. 514.

HIPPURIC-ACID SYNTHESIS TEST OF LIVER FUNCTION

SOME DIFFICULTIES IN INTERPRETATION

SHEILA SHERLOCK
M.D. Edin., M.R.C.P.
BEIT MEMORIAL RESEARCH FELLOW
From the Department of Medicine, British Postgraduate Medical School

THE detoxication of benzoic acid by its conjugation with glycine to form hippuric acid is widely used as a test of hepatic function. Too often, however, a low result is attributed to liver disease, without consideration of the other factors involved. This is particularly so in the diagnosis of doubtful cases of infective and toxic hepatitis and cirrhosis, where clinical diagnosis may be difficult. Operation or necropsy findings have hitherto provided the only certain diagnostic proof.

I have used the aspiration liver-biopsy technique of Iversen and Roholm (1939) to study freshly fixed material in close time-relation to the function test. At once difficulties in the interpretation of the hippuric-acid test became apparent. These difficulties, and the technical problems encountered, are discussed below.

METHODS

The intravenous technique of Quick et al. (1938) was used. The patient is allowed a light breakfast. The sodium benzoate is made up in an 8·85% solution; 20 ml. of this, containing 1·77 g. of sodium benzoate and equivalent to 1·5 g. of benzoic acid, is injected intravenously. The injection should take at least five minutes. Immediately after completion of the injection and again an hour later the bladder is emptied. The whole one-hour specimen of urine is sent to the laboratory. An adequate specimen of urine is ensured by giving the patient a pint of water to drink just before the injection.

Analysis.—The method is that of Weichselbaum and Probstein (1939). The volume of urine is measured. If the volume is large, the urine is acidified with acetic acid and boiled down to less than 200 ml. The urine is next saturated with sodium chloride, 30 g. being added to each 100 ml. This is dissolved by heating, and the urine is filtered. The filtrate is made acid to congo red with 50% sulphuric acid, and an excess of 1 ml. is added. The precipitation of hippuric acid is hastened by scratching the side of the vessel with a glass rod and if necessary by the addition of a crystal of hippuric acid. The flask is left overnight in the ice-box. Next day the hippuric-acid crystals are filtered off with suction and are washed with 20 ml. of 30% sodium-chloride solution. They are then transferred to a flask. On warming, the crystals dissolve readily in distilled water. The solution is titrated against 0·5 *N* sodium hydroxide, phenolphthalein being used as an indicator.

Calculation.—Allowance is made for the 0·1 g. of hippuric acid remaining in every 100 ml. of urine saturated with sodium chloride and for the hippuric acid dissolved by the 20 ml. of saline wash. Grammes of hippuric acid excreted =

$$(\text{ml. of } 0{\cdot}5\ N\ \text{NaOH} \times 0{\cdot}072) + \frac{0{\cdot}1 \times (\text{ml. of urine} + 20)}{100}.$$

ANALYTICAL DIFFICULTIES

In some cases the hippuric acid is not precipitated from the urine even after saturation with salt and acidification. This difficulty has received little emphasis in published work. We have encountered it fairly commonly: it occurred in 31 tests, on 21 subjects, out of a total of 180 tests performed in eighteen months. It occurs more often in the intravenous than in the oral test, perhaps because the quantity of hippuric acid excreted is less. In 6 patients the lack of precipitation coincided with impaired renal function (see below). In the other 15 the patient was deeply jaundiced and the urine was very dark; 11 had obstructive jaundice and 4 acute hepatitis. The difficulty arises most often in dealing with highly pigmented urines; its incidence in jaundiced subjects was 15 in 93 cases (16%). To reduce precipitation difficulties the following precautions should be observed:

(1) Where a low excretion is expected, the sample should be evaporated down to 50 ml. Less hippuric acid will then be held in solution and more become available for precipitation.
(2) Dark urine is decolorised by boiling for a few minutes with 'Norit' or charcoal. The specimen is then filtered (Weichselbaum and Probstein 1939).
(3) Any protein in the sample is removed by boiling in slightly acid solution, followed by filtration,
(4) After addition of the mineral acid the side of the vessel is scratched with a glass rod. A crystal or two of hippuric acid may be added to provide nuclei for crystallisation.
(5) The acidified specimen is left for twenty-four hours in the ice-chest.
(6) As a last resort, a weighed amount of hippuric acid is dissolved in the urine by warming. The total hippuric acid is estimated, and by subtraction the amount in the original sample is determined.

Occasionally, despite these steps, precipitation does not take place. The quantity of substance may be too small, or some interfering substance, possibly a protective colloid, may be present in the urine.

RESULTS IN SUBJECTS WITHOUT LIVER DISEASE

The intravenous hippuric-acid test was carried out on 6 healthy persons and on 24 patients with conditions unrelated to the liver. The hippuric acid is expressed in terms of sodium benzoate in table I. The mean is 1·01 g.; range 0·75–1·21; S.D. 0·088. These figures compare well with those quoted by Quick (1939), who gives a range of 0·7–0·95 g. expressed as benzoic acid, which in terms of sodium benzoate becomes 0·83–1·12 g.

RENAL FUNCTION AND THE HIPPURIC-ACID TEST

The kidneys and the liver both take part in hippuric-acid metabolism. This has led to confusion in the interpretation of the hippuric-acid test. The wide species variation in site of synthesis makes animal experiments difficult to evaluate. In man, kidney disease is associated with impaired excretion of hippuric acid (Jaarsveld and Stokvis 1879, Violle 1920). Bryan (1925) used the test as an index of kidney function. Kohlstaedt and Helmer (1936) recorded 9 cases of nephritis in which an impaired urea clearance coincided with a low hippuric-acid test. Henderson and Splatt (1942) mentioned 11 similar instances. Even if hippuric acid is not synthesised by the kidney, its ultimate excretion demands adequate renal function. The power of excretion is 2·5 times the power of synthesis (Schwei and Quick 1942); hence there is a wide margin for faulty kidneys. Kohlstaedt and Helmer (1936) and Moser at al. (1942) recommended that a simultaneous urea-clearance test should be done in parallel with the intravenous hippuric-acid test. A one-hour urea clearance has been carried out in all our cases. If it had not been done, a wrong diagnosis of liver disease, based on the hippuric-acid test, would have been made in 9 cases.

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TABLE I—INTRAVENOUS HIPPURIC-ACID TEST IN 30 SUBJECTS WITHOUT LIVER DISEASE

Age (yr.) and sex	Weight (kg.)	Diagnosis	Urea clearance (%)	Vol. of urine (ml.)	Excretion of hippuric acid* (g.)
56 F	62	Normal	95	114	1·00
23 M	61	Normal	64	400	1·02
30 M	62	Normal	112	675	1·05
26 F	57	Normal	120	435	1·04
22 F	60	Normal	165	590	1·15
22 M	75	Normal	137	450	1·20
15 M	57	Convalescent pneumonia	138	530	1·15
28 M	59	Convalescent pneumonia	173	435	0·75
17 F	54	Convalescent pneumonia	..	185	0·94
21 F	54	Convalescent bronchitis	..	176	0·91
16 M	64	Convalescent bronchitis	124	74	0·96
52 M	60	Convalescent bronchitis	109	82	1·05
35 M	66	Convalescent bronchitis	129	570	1·19
60 M	61	Convalescent coron. thromb.	102	176	1·21
52 M	92	Convalescent coron. thromb.	99	335	1·21
44 M	66	Aortic stenosis, not in failure	130	435	0·95
32 M	61	Convalescent (tonsillitis)	..	232	1·10
39 M	70	Osteo-arthritis	148	70	1·13
59 M	61	Healed gastric ulcer	132	84	0·81
41 M	63	Healed gastric ulcer	91	240	0·81
43 M	63	Healed gastric ulcer	73	115	1·16
30 F	57	Convalescent (gastro-enteritis)	99	160	1·05
30 F	50	Hysteria	94	225	0·79
30 F	52	Vasovagal faints	80	340	0·88
55 M	62	Cerebral arteriosclerosis	57	323	0·88
43 F	40	Parkinson's disease	78	236	0·90
17 M	66	Vasovagal faints	130	70	0·93
50 M	60	Abducent neuritis	188	106	1·05
35 M	71	Menière's syndrome	141	535	1·00
27 F	52	Neurosis	131	115	1·11

* The hippuric-acid excretion in this and subsequent tables is expressed in terms of sodium benzoate.

Cases 1–4 (table II) had a raised plasma-urea level, and the low hippuric-acid excretion confirms the contention of Snapper and Grünbaum (1924) that azotæmia is associated with impaired hippuric-acid excretion. In case 4 the nitrogen retention was due to the renal damage occurring in Weil's disease. The hippuric-acid test should not be used as an indication of liver function in this condition.

Apart from defective kidneys, an apparently low urea clearance and hippuric-acid test may be due to defective collection of the one-hour urine specimen. The bladder may not be completely emptied at the end of the test. Case 5 may be an example. Ideally the urine should be obtained by catheter before and at the end of the test period, but this has proved so inconvenient that it has been avoided. In 4 instances (cases 6, 7, 8, and 9, table II) the test was repeated next day. On the second occasion the urea clearance was normal and the hippuric-acid excretion more in keeping with the histological appearances of the liver as shown by biopsy. These subjects were all young men, and urine was passed in the upright posture. It is inconceivable that the remarkably low urea clearance could have been caused solely by retention of urine in the bladder at the end of the test period. The conspicuous difference between the two renal-function tests is in the increased concentrating power of the kidney on the second occasion. It seems as if a transitory impairment of concentrating power can occasionally develop in otherwise normal kidneys and give rise to an abnormal urea clearance and a low hippuric-acid excretion.

A urea-clearance test should be performed in conjunction with every intravenous hippuric-acid test, not only to determine possible defects in renal function but also as a check on faults in the collection of the urine. The two-hour consecutive urea clearance is more reliable than the one-hour. Wherever a low result for the hippuric-acid test is associated with a low urea clearance, the test should be repeated with a urea clearance over two consecutive hours.

RELATION OF HIPPURIC-ACID EXCRETION TO VOLUME OF URINE

Snapper and Grünbaum (1924) noted that patients with urea retention could eliminate more hippuric acid in a large volume of urine than in a small one. Machella et al. (1942) investigated 100 cases with hepatic dysfunction and found a significant direct correlation between the amount of hippuric acid eliminated by the kidney and the volume of urine secreted during the same period. Higher than normal values were associated with large volumes of urine, and low values could be increased to normal by diuresis. In 4 normal controls and 8 subjects with liver disease the test was performed before and after water diuresis. A significant increase in hippuric-acid excretion was produced in each case.

Probstein and Londe (1942) diverge from these views; they found that in normal subjects no relation existed between urine volume and hippuric-acid excretion. Boyce and McFetridge (1938) also state that, if the concentrating power of the kidney is maintained, low urine volumes are of little consequence. In view of these contradictory opinions further experiments were carried out.

In 30 normal subjects the relation between the weight of hippuric acid synthesised and the volume of urine

TABLE II—LOW HIPPURIC-ACID EXCRETIONS ASSOCIATED WITH APPARENT RENAL INSUFFICIENCY AND NORMAL LIVER HISTOLOGY

Case	Age (yr.) and sex	Clinical diagnosis	Liver-biopsy findings	Plasma-urea (mg./100 ml.)	Urine urea (mg./100 ml.)	R.E. %*	Urine volume (ml.)	Hippuric acid (g.)
1	68 F	? Ovarian tumour ? Cirrhosis of liver	Normal liver†	163	2720	41	50	0·2
2	64 M	Jaundice 2 years ago; ? cirrhosis	Normal liver	89	1500	69	180	0·52
3	60 F	Hæmatemesis; post-transfusion jaundice	Normal liver‡	69	1880	90	190	0·3
4	45 M	Weil's disease	Normal parenchyma; residual portal tract scarring	64	566	35	180	0·3
5	64 M	? Cirrhosis	Normal liver	32	1040	41	81	0·52
6	28 M	? Post-hepatitis cirrhosis	Normal liver	20 25	145 1100	27 156	170 240	0·36 0·74
7	26 M	? Post-hepatitis cirrhosis	Normal liver	17 22	72 765	48 128	510 166	0·52 1·2
8	26 M	? Cirrhosis ? Acholuric jaundice	Normal liver†	32 37	375 725	31 174	120 400	0·7 1·16
9	31 M	? Cirrhosis	Normal liver	43 47	282 445	53 92	365 435	0·4 0·92

* R.E. % = renal efficiency as a percentage of the normal urea clearance.
† Confirmed at operation. ‡ Confirmed at autopsy.

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passed during the test period is shown in table I and fig. 1. No correlation existed between the two factors. (Correlation coefficient (r) is −0·0023.)

In 10 normal subjects and 4 subjects with liver disease, in whom the output of urine was about 100 ml., the test was repeated after a water diuresis. The increased urinary output was ensured by giving a pint of water 15 min. before the injection and a further pint during the first half-hour. Results are shown in table III. In these 14 instances, for a mean urinary volume of 86 ml. the mean hippuric-acid excretion is 0·88 g. If the mean urinary volume becomes 439 ml., the mean excretion becomes 0·92. The difference between the hippuric-acid means is not significant.

If the volume of urine is very small, less than 50–60 ml., results should be interpreted with caution, and the test repeated with a larger volume. Apart from this I have found no correlation between volume and test results.

RELATION OF BODY-WEIGHT TO TEST RESULTS

There is evidence that organ size varies with body-weight and surface area (Greenwood and Brown 1913). The test dose of sodium benzoate is such that a maximal load is put on every liver-cell. The larger the liver, therefore, the more hippuric acid can be synthesised. Quick (1931) states that, if glycine is given with the

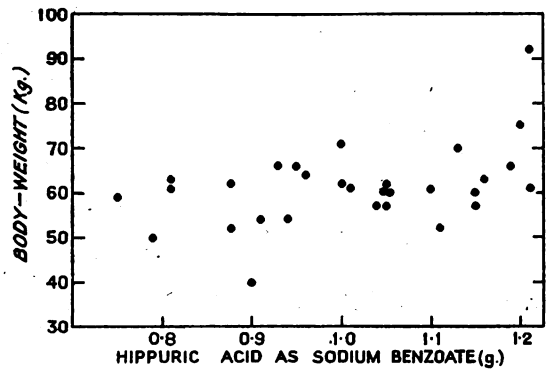

Fig. 2—Relation of body-weight to amount of hippuric acid excreted.

sodium benzoate, the excretion of hippuric acid reaches a maximum varying with the size of the individual and so of his liver. Hepler and Gurley (1942) gave no upper limit for test results, because this depends on body size. Machella et al. (1942) could find no correlation between body-weight and excretion of hippuric acid. Scurry and Field (1943), who studied the matter in more detail, found that in normal subjects a significant positive correlation existed between surface area or body-weight and the weight of hippuric acid excreted; formulæ were evolved relating these factors.

I have noted the body-weight and the hippuric-acid excretion in 30 normal subjects (table I). Fig. 2 shows that the correlation is very slight (r=0·311, which is not significant). In subjects of average weight it is unnecessary to allow for small differences in weight. In the very large or very small the formulæ of Scurry and Field can usefully be applied to obtain a more accurate estimate of synthesis.

HIPPURIC-ACID SYNTHESIS IN NON-HEPATIC DISEASES

Low results for the hippuric-acid test have been reported in conditions which do not primarily affect the liver: anæmia (Fouts et al. 1937, Henderson and Splatt 1942); pregnancy and diabetes mellitus (Moser et al. 1942); gastro-enteric malignant disease not involving the liver (Paulson and Wyler 1942); general infections and debilitating diseases (De Lor and Reinhart 1940); myelomatosis, carcinoma, and thyrotoxicosis (Higgins et al. 1944); and after surgical operations on patients without biliary disease (Campbell 1942).

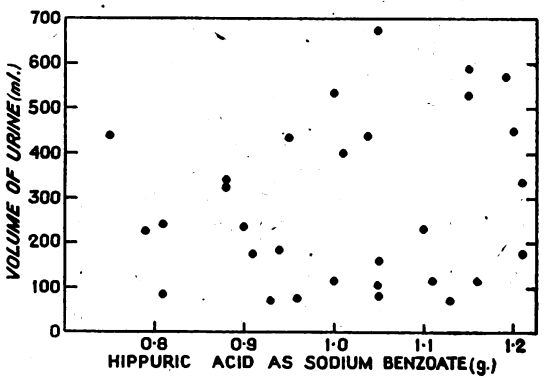

Fig. 1—Relation of volume of urine to amount of hippuric acid excreted.

My results have been fully in accord with those reported by others. I have found low results in anæmia of various types, in diabetes, in pneumonia, and in malignant disease not involving the liver (table IV). In each instance the volume of urine during the test period was adequate and renal function was not impaired. Intravenous galactose tests (King and Aitken 1940) gave normal results. Bromsulphthalein tests (dose 5 mg. per kg.) were within normal limits. Hepatic tissue obtained by operation, autopsy, or aspiration biopsy showed no histological change. In two of the cases (cases 4 and 7, table IV) the hippuric-acid excretion returned to normal with cure of the anæmia.

Of course every case of the conditions tabulated is not associated with an impaired hippuric-acid test, but the incidence is high enough to reduce the value of the test in the distinction of these cases from primary liver diseases. The observations suggest one of two alternatives: either the test is a much more sensitive index of liver function than either the bromsulphthalein or the galactose test, or else hippuric-acid synthesis is not a measure of liver or kidney function alone.

DISCUSSION

Synthesis of hippuric acid in man, despite the many published reports, is still little understood. Although

TABLE III—HIPPURIC-ACID TEST PERFORMED WITH LOW AND HIGH URINE VOLUMES

Case	Low volumes		Increased volumes	
	Urine volume (ml.)	Excretion of hippuric acid (g.)	Urine volume (ml.)	Excretion of hippuric acid (g.)
		NORMALS		
1	110	1·15	590	1·15
2	66	1·01	450	1·20
3	70	1·03	530	1·13
4	132	1·03	650	1·02
5	94	1·01	435	1·04
6	94	1·14	570	1·00
7	84	0·81	372	0·73
8	50	0·73	435	0·75
9	74	0·96	160	0·80
10	46	0·70	82	1·05
		LIVER DISEASE		
1	66	1·21	240	1·51
2	125	0·69	900	0·73
3	148	0·60	315	0·52
4	60	0·31	400	0·33
Mean	86	0·88	439	0·92

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the weight of evidence points to the liver as the site of synthesis, this is by no means certain. Impaired synthesis in patients in whom neither renal nor hepatic damage can be demonstrated suggests that the liver and kidney are not the only possible participants in the process.

The intravenous hippuric-acid test is easily performed, simple, and safe. Cost is minimal. Analytical manipulations are easy, but difficulties are often encountered and may make results unreliable. Clinicians not cognisant of the multitude of factors involved in the test will often wrongly interpret a low result.

TABLE IV—LOW HIPPURIC-ACID SYNTHESIS IN VARIOUS NON-HEPATIC DISEASES WITH NORMAL LIVER HISTOLOGY

Case	Age (yr.) and sex	Diagnosis	Hippuric-acid excretion (g.)	Notes
1	72 M	Hæmolytic anæmia	0·4	6·24 g. Hb (40 %)*
2	55 F	Hæmolytic anæmia	0·3	4·01 g. Hb (26 %)
3	80 F	Pernicious anæmia	0·2	6·24 g. Hb (40 %)
4	64 M	Pernicious anæmia	0·6 1·2	7·35 g. Hb (47 %) 12·5 g. Hb (80 %)
5	17 M	Iron-deficiency anæmia	0·7	7·8 g. Hb (50 %)
6	62 M	Post-gastrectomy anæmia	0·5	8·0 g. Hb (51 %)
7	24 M	Post-hæmorrhagic anæmia	0·6 1·2	6·24 g. Hb (40 %) 10·1 g. Hb (65 %)
8	59 F	Leuco-erythroblastic anæmia	0·7	7·8 g. Hb (50 %)
9	35 M	Anæmia, ? cause	0·31	7·8 g. Hb (50 %)
10	44 M	Carcinoma of stomach	0·73	Autopsy. No hepatic metastases
11	60 M	Malignant ascites	0·63	
12	50 M	Carcinoma of lung	0·73	
13	70 F	Diabetes mellitus	0·33	..
14	40 F	Diabetes mellitus	0·67	..
15	42 F	Diabetes mellitus	0·5	..
16	28 M	Convalescent pneumonia	0·44	..
17	50 M	Afebrile pneumonia	0·62	..
18	46 M	Lung abscess	0·60	..
19	46 F	Rheumatoid arthritis	0·7	Active phase. Pyrexial

* % of Haden normal (100 % = 15·6 g. Hb).

SUMMARY

Observations have been made with the intravenous hippuric-acid test and the results compared with the histology of liver-biopsy material.

Adequate renal function is an essential prerequisite for the use of this test as an index of liver function. A urea-clearance test should always be done in parallel with the hippuric-acid test.

The relation between the amount of hippuric acid and the volume of urine excreted during the test period has been investigated. If the volume exceeds 50–60 ml., a diuresis will not increase the quantity of hippuric acid excreted.

In persons of average size no correlation exists between body-weight and the quantity of hippuric acid excreted.

Low results have been encountered in various conditions in which liver damage cannot be detected by the biopsy technique or by other function tests.

I am indebted to Prof. E. J. King and Dr. John McMichael for much helpful advice, and to Miss V. M. Walshe, B.SC., for help in the biochemistry. Part of this work was done during the tenure of a maintenance grant from the Medical Research Council, to whom I am also indebted for defraying the expenses of this investigation.

References at foot of next column

COMPARATIVE VALUE OF TUBERCULIN TESTS

E. H. W. DEANE
M.B. Melb.
CONSULTANT TUBERCULOSIS OFFICER,
LANCASHIRE COUNTY COUNCIL

THIS is a report of a small series of known positive Mantoux reactors and their reactions to the Vollmer patch and the tuberculin jelly tests.

MANTOUX TEST

Whatever other method of testing is used, the Mantoux reaction in serial dilution is accepted as a standard for comparison; the children tested in this series were all known Mantoux-positive reactors to 0·1 c.cm. of the 1 in 1000 dilution, old tuberculin being used as the testing fluid. In this strength 96–98% of all Mantoux reactions give a positive result,[1] hence for clinical purposes this is the most convenient strength to use, and it has been my practice, except on rare occasions, to use only a single injection of this dilution.

Often of more importance, however, than the development of a positive skin reaction proving a tuberculous infection is the persistence of a negative reaction to exclude it. Any method of tuberculin testing, to be of clinical value, must therefore give a high percentage of positive results in infection; otherwise the value of a negative result in excluding a diagnosis of tuberculosis is limited.

Apart from reliability, one advantage of the Mantoux over other tuberculin tests lies in the fact that it is to some extent quantitative, a known amount of a known strength of tuberculin being introduced within the dermal layers; all other methods suffer from this lack, the jelly test particularly so in that the amount of tuberculin applied to and absorbed by the skin must be a variable factor.

Although the Mantoux is undoubtedly the most reliable of the tuberculin tests, it has the disadvantages in clinic practice that (1) solutions to be effective should be freshly prepared, which often means a considerable waste if only a few children are to be tested at one time, and that (2) intradermal injection is momentarily very painful, which upsets children on a first visit to a clinic and does not make for happy relations at subsequent visits. Moreover, for patients seen at home it is unsatisfactory to carry and sterilise needles and syringe.

1. Hart, P. D. *Spec. Rep. Ser. med. Res. Coun., Lond.* 1932, no. 164.

DR. SHERLOCK: REFERENCES

Boyce, F. F., McFetridge, E. M. (1938) *Arch. Surg.* **37**, 401.
Bryan, A. W. (1925) *J. clin. Invest.* **2**, 1.
Campbell, D. A. (1942) *Surgery*, **11**, 195.
De Lor, C. J., Reinhart, H. L. (1940) *Amer. J. clin. Path.* **10**, 617.
Fouts, P. J., Helmer, O. M., Zerfas, L. G. (1937) *Amer. J. med. Sci.* **193**, 647.
Greenwood, M., Brown, J. W. (1913) *Biometrika*, **9**, 473.
Henderson, M., Splatt, B. (1942) *Med. J. Aust.* **i**, 185.
Hepler, O. E., Gurley, H. (1942) *J. Lab. clin. Med.* **27**, 1593.
Higgins, G., O'Brien, J. R. P., Stewart, A., Witts, L. J. (1944) *Brit. med. J.* **i**, 211.
Iversen, P., Roholm, K. (1939) *Acta. med. scand.* **102**, 1.
Jaarsveld, G. J., Stokvis, B. J. (1879) *Arch. exp. Path. Pharmakol.* **10**, 268.
King, E. J., Aitken, R. S. (1940) *Lancet*, **ii**, 543.
Kohlstaedt, K. G., Helmer, O. M. (1936) *Amer. J. dig. Dis.* **3**, 459.
Machella, T. E., Helm, J. D., Chornock, F. W. (1942) *J. clin. Invest.* **21**, 763.
Moser, R. H., Rosenak, B. D., Hasterlik, R. J. (1942) *Amer. J. dig. Dis.* **9**, 183.
Paulson, M., Wyler, C. I. (1942) *Ann. intern. Med.* **16**, 872.
Probstein, J. G., Londe, S. (1942) *Arch. Surg.* **45**, 253.
Quick, A. J. (1931) *J. biol. Chem.* **92**, 65.
— (1939) *Amer. J. dig. Dis.* **6**, 716.
— Ottenstein, H. N., Weltchek, H. (1938) *Proc. Soc. exp. Biol. N.Y.* **38**, 77.
Schwei, G. P., Quick, A. J. (1942) *Ibid*, **50**, 319.
Scurry, M. M., Field, H. jun. (1943) *Amer. J. med. Sci.* **206**, 243.
Snapper, I., Grünbaum, A. (1924) *Klin. Wschr.* **3**, 101.
Violle, P. L. (1920) *Ann. Méd.* **7**, 272.
Weichselbaum, T. E., Probstein, J. G. (1939) *J. Lab. clin. Med.* **24**, 636.

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VOLLMER PATCH

The introduction of the Vollmer patch test at first seemed to solve this problem; application is painless and simple, and the test can easily be carried to patients at home. Results, however, were disappointing, especially with patches used some time after their date of issue, although well within the time limit set by the manufacturers.

Fifty known Mantoux-positive (1 : 1000 O.T.) children were therefore tested with the Vollmer patch, first with freshly manufactured patches and later with patches 11 months old. The results were 40 (80%) positive reactors in the first instance and only 8 (16%) reactors in the second. The test is therefore considered insufficiently reliable for further use.

TUBERCULIN JELLY

The more recently introduced tuberculin jelly (Allen and Hanburys) has been subjected to a similarly controlled experiment. The jelly possesses the same advantages of ease of application and portability as does the Vollmer patch, and being less subject to drying is expected to keep better, although this point has not yet been verified.

Forty children (again Mantoux +, 1 : 1000) were tested by applying the jelly after cleansing the skin with acetone, covering with adhesive plaster for 48 hours, and reading the result 48 hours later; 35 (87·5%) were found positive.

This result, although better, was not considered good enough for diagnostic purposes. The effect was therefore tried of abrading the skin after cleansing and before the application of the jelly. For this purpose the skin is gently rubbed for 5 or 6 strokes with fine cabinet-makers' sandpaper (no. 0) and the test carried out as before. When the test was carried out in this way, all 40 children showed a positive reaction; hence in this small series tuberculin jelly appears as reliable as the Mantoux 1 : 1000 reaction.

The "sandpapering" of the patient should be only lightly done, and it does not appear necessary to produce even an erythema; if it is carried too far, the superficial epidermal layers may be rubbed away and a severe reaction follow. The procedure is painless, and no child has raised objection. As a further control, the area to which the jelly is applied is now covered with a 1-inch square of waxed paper before the application of the adhesive plaster, to prevent possible confusion of reaction with plaster rash.

The results of the tests are as follows:—

	Vollmer (50 children)		Tuberculin jelly (40 children)	
	Fresh	11 months old	Without abrasion	After skin abrasion
No. of positive results	40	8	35	40

SUMMARY

Results obtained with the Vollmer patch and tuberculin jelly tests in Mantoux-positive children are compared. The Vollmer patch test was found to be unreliable.

A technique for the tuberculin jelly test is described, which seemed to be as reliable as the Mantoux test.

My thanks are due to Dr. Jonathan Dobson, medical superintendent of Wrightington Hospital, for permission to carry out these tests in his wards.

PENICILLIN LOZENGES.—The Ministry of Health announces that a limited issue of penicillin lozenges is now being made to hospitals. Medical practitioners will also be able to obtain a limited supply for carefully selected cases in their own practices by applying to the nearest distributing centre.

Medical Societies

ROYAL SOCIETY OF MEDICINE

AT a meeting of the obstetric section on Jan. 18, with Prof. F. J. BROWNE, the president, in the chair, a discussion on

Bacteræmia in Puerperal Sepsis

was opened by Mr. JAMES WYATT, consultant to the L.C.C. puerperal sepsis unit at the North-Western Hospital, who briefly described the inception of the unit in 1925 and the work which it has done during the past 20 years. Full laboratory investigations, including aerobic and anaerobic culture of cervical swabs, aerobic, anaerobic, and quantitative blood-culture, serological tests for V.D., nose and throat swabs from mother and infant, and complete urinalysis, have been carried out on all cases since 1936 when a group laboratory was established at the North-Western Hospital. The results now being reported were an analysis of routine blood-cultures on 2025 patients during the eight years 1937–44.

Dr. ROBERT CRUICKSHANK, after describing the technical details of blood-culture, suggested that bacteræmia could be either transient, as happened after extraction of a tooth or the passing of a catheter, or more persistent, when there was an active focus of infection, as in lobar pneumonia or in typhoid fever. Many of the cases of puerperal sepsis with positive blood-culture fell into the second category, and it was important in prognosis and in assessing the value of chemotherapy to differentiate persistent bacteræmia from septicæmia, which until the advent of the life-saving drugs was a progressively severe and usually fatal infection associated with generalised bacterial invasion of the tissues. The two conditions could usually be distinguished by their clinical features combined with a quantitative estimation of the bacteria in the blood and a repeat blood-culture 1–3 days after the initial positive culture. In the analysis of the results, this series of cases was divided into two groups, postabortum and postpartum sepsis, according as the pregnancy terminated before or after the 28th week of gestation. During the eight-year period there were 760 cases of postabortum sepsis, or 37·5% of the total admissions. In this group bacteræmia occurred in 73 or 9·7% and septicæmia in 51 or 6·7%; by contrast bacteræmia and septicæmia occurred in only 2·7% and 2·4% of the postpartum series. This preponderance of blood-stream infections in the postabortum group seemed odd, for the greater trauma to the genital tract after full-term pregnancy might be expected to lead more often to bacteræmia. In the search for the causes that predisposed to bacteræmia, analysis was made of the age and parity distribution of the two groups. It was noted that the postpartum group had a younger age-distribution than the postabortum series, and there was a higher proportion of septicæmic than of bacteræmic cases at ages over 35 years in both the postabortum and postpartum groups. This tendency to more severe infection in middle-aged patients has been noted in other diseases—e.g., pneumonia and typhoid—and is presumably related to a lowered resistance of ageing tissues to infection. The outstanding feature as regards parity was that two-thirds of both bacteræmias and septicæmias in the postpartum group were in primiparæ, a finding which was probably associated with the severe trauma to tissues that occurs in a first confinement. On the other hand, the frequency of retained products after abortion was probably the most important factor in predisposing to infection and blood-stream invasion in the postabortum group, and in fact 55 out of the 73 postabortum cases with bacteræmia had either obvious retained products or a profuse offensive lochia.

When analysis of blood-stream infection was made according to the infecting organism a significant point was the pronounced tendency to septicæmia among postabortum cases infected with *Staphylococcus aureus*; 25 out of 57 (43·8%) of these cases had positive blood-culture; 21 of the 25 were classified as septicæmia. In the postpartum group there were 15 positive blood-cultures among 70 patients and 9 were septicæmic. With coliform infections only 30 out of 217 (13·8%)

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in the postabortum series had positive blood-culture and 3 of these were regarded as septicæmias; in the postpartum series there were only 7 positive blood-cultures among 150 cases. Blood-stream infection with the hæmolytic streptococcus occurred in 17 out of 107 (15·9%) postabortum cases and of these 11 were bacteræmic and 6 septicæmic; but only 8 of these 17 hæmolytic streptococcus strains belonged to Lancefield group A. In the postpartum group there were 23 out of 441 (5·1%) positive blood-cultures, 12 being bacteræmic and 11 septicæmic; all but one of these strains belonged to group A. Anaerobic infections due to sporing (mostly *Cl. welchii*) and non-sporing organisms (anaerobic streptococcus and *Bact. necrophorum*) were grouped together. Again a much greater incidence of blood-stream infection was noted in the postabortum than the postpartum group (42 out of 221, or 19%, against 13 out of 175, or 7·4%); but whereas the non-sporing anaerobes were more likely to be associated with septicæmia, *Cl. welchii* was usually bacteræmic. Only 4 out of 21 patients from whose blood this organism was isolated were typical welchii septicæmias. Quantitative counts of the three main aerobic pathogens showed that counts of over 5 organisms per c.cm. were never found in the bacteræmias due to the hæmolytic streptococcus, whereas counts between 6 and 30 occurred in half the *Staph. aureus* bacteræmias and counts over 100 per c.cm. were occasionally found with the *Bact. coli* bacteræmias. These figures may give some indication of the relative virulence of the three pathogens.

Dr. A. M. RAMSAY discussed the treatment of septic abortion in the light of the frequent occurrence of bacteræmia and septicæmia in association with retained products which acted as a focus of infection. He pointed out that patients with inevitable abortion frequently had pyrexia during abortion but that such pyrexia was not as a rule accompanied by any clinical or bacteriological evidence of infection. Unfortunately these cases were often notified as puerperal pyrexia and sent to the unit, particularly from outpatient departments of general hospitals. When infection had occurred treatment was rather conservative. Obvious necrotic material was removed with the finger but the uterus was not explored unless severe hæmorrhage had occurred. In the past a positive blood-culture had too readily been accepted as evidence of severe infection; and in assessing the value of chemotherapeutic drugs in puerperal sepsis the clinician must differentiate bacteræmia from septicæmia, otherwise extravagant claims would be made for the particular therapy. A similar conclusion had been reached by various workers in regard to chemotherapy in staphylococcal infections, where it was shown that patients with low colony counts in the blood usually recovered, whereas the prognosis was much more grave with high counts. Dr. Ramsay then showed a series of charts illustrating cases of bacteræmia and septicæmia due to *Staph. aureus*, *Bact. coli*, hæmolytic streptococcus, and *Cl. welchii*.

The discussion that followed mainly centred round the use of the term "bacteræmia" and the treatment of septic abortion. Mr. G. F. GIBBERD, who was supported by the PRESIDENT and others, thought that bacteræmia should be limited to the more or less accidental finding of bacteria in the blood-stream, unassociated with clinical evidence of infection, and that the term "blood-stream infection," either mild or severe, should be used to include persistent bacteræmia and septicæmia.

Mr. E. C. B. BUTLER had found the quantitative blood-culture very useful in the prognosis of staphylococcal infections. Patients with counts of less than 20 per c.cm. usually recovered and over 20 usually died.

Dr. J. M. ALSTON thought that the main difficulty in puerperal infection was to prognosticate about the severity of the infection in an early case.

Mr. ALECK BOURNE suggested that in using chemotherapy the clinician must be guided by the condition of the patient rather than by the bacteriologist's report.

Dr. MÉAVE KENNY advocated more care in the prevention of infection; in colloquial phraseology "Don't breathe on 'em and don't bash 'em."

Mr. A. J. WRIGLEY mentioned the association of welchii infection with macerated fœtus and was in favour of the removal of septic retained products; others dissented from this view.

Reviews of Books

Manual of Clinical Mycology

NORMAN F. CONANT, PH.D., assistant professor of bacteriology; D. S. MARTIN, M.D., associate professor of bacteriology; D. T. SMITH, M.D., professor of bacteriology and associate professor of medicine; R. D. BAKER, M.D., associate professor of pathology; J. L. CALLAWAY, M.D., assistant professor of medicine; all at the Duke University, North Carolina. London: W. B. Saunders. Pp. 348. 17*s.* 6*d.*

THIS handbook, one of a series of military medical manuals, covers a wide field of fungus diseases, ranging from the common ringworm of the feet to such rare maladies as histoplasmosis, which according to the authors has seldom been diagnosed before autopsy. The material is well presented; while the greater part is of practical value mainly to students and practitioners of tropical medicine and to pathologists, there is much of general interest, especially in the section on dermatomycoses. The fine illustrations and the sections on laboratory methods add to the usefulness of the work, and there is a list of prescriptions in the appendix. There is evidence of much patient research by the authors, and its presentation in a lucid manner should stimulate others to follow them.

A Textbook of Surgery

(6th ed.) JOHN HOMANS, M.D., emeritus clinical professor of surgery, Harvard. Springfield, Illinois: Charles C. Thomas. Pp. 1278. $8.

THIS is a new and revised edition of a single-volume textbook of surgery—the joint work of such outstanding figures of the Harvard school as Cushing, Osgood, and Philip Wilson—which has won for itself deserved popularity in the States. It is less dogmatic than a similar work would be in this country; the frequent references to current work and to differences of opinion savour of postgraduate discussion, and the big bibliography of surgical papers may seem a little out of place in a work for students. Nevertheless this attitude, aided by an admirable historical introduction to each section, has its advantages in presenting surgery as a fluid and developing subject. It is a pity that there are no reproductions at all of X-ray photographs; diagrams based on them are of less value. Sayre's method of treating a fractured clavicle might have been omitted; and the use of external skeletal fixation of the Stader or Roger Anderson type for fractures in general is accepted as conventional. The whole subject of sciatica and the prolapsed intervertebral disk is not as well presented as we should expect in an American work. Pessimism is expressed about the outlook in ankylosing spondylitis and no mention is made of radiotherapy for this disease. The advice to abandon the use of a hollow tube in the anal canal after hæmorrhoidectomy may lead to an occasional disaster, and the statement that the results of operation for inguinal hernia are most satisfactory is somewhat optimistic—over 90% of cures is more than most of us can achieve.

"Hippocrates" and the Corpus Hippocraticum

W. H. S. JONES, F.B.A. London: Oxford University Press. Pp. 23. 3*s.* 6*d.*

IN this reprint from the *Proceedings* of the British Academy Mr. Jones reviews the present position of Hippocratic criticism. He indicates a tendency during the last thirty years to discount the testimony of Alexandrine writers as to the authorship of the works, and to attach more value to evidence furnished by Plato and Menon. After subjecting the relevant passages in the *Phaedrus* and *Anonymus* to critical analysis he concludes that the evidence to be found in them also is both slight and uncertain. An attitude of agnosticism must be maintained on the authorship of the *Corpus*, and the rôle of Hippocrates, as its author, possessor, or collector, remains a matter of conjecture. He agrees with W. A. Heidel in placing most reliance on the internal criteria to be found in the *Corpus* itself, and believes that the most fruitful line of research lies in a more detailed study of Hippocratic grammar and syntax.

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THE LANCET

LONDON : SATURDAY, FEBRUARY 2, 1946

Not Applicable

SOME doctors returning from the Services find immediate occupation in relieving overworked partners, nursing shrivelled practices, taking long-deferred examinations, or otherwise resuming interrupted careers. Many have no such task ready to hand: they must decide what they want to do in medicine, and how best to set about it. These decisions are complicated by uncertainty about the pattern of the future health service—an uncertainty that was bound to discourage fresh enterprise. Those who seek salaried appointments complain that few are being announced; while others who think of buying a general practice hesitate to invest or borrow capital which they may find it hard to recoup or return in full. As a rule, however, the demobilised doctor cannot afford to bide his time; often he must make his own estimate of what the future holds, and act on it. At a time of low visibility, he may well think it best to stay temporarily in one of the posts provided for his further training. These undoubtedly represent a big improvement on what his father knew in 1919. Now, as then, any ex-Service officer (including doctors) can apply to the Government for a grant to cover fees for courses and examinations; and he can secure maintenance up to £160 a year, an allowance of £110 for his wife, and £40 for each child. Today, in addition, there is a special scheme for medical men and women, which is larger than anything previously attempted in this country in postgraduate education. Nevertheless we feel obliged to ask whether, measured against great needs, these arrangements are sufficient.

Under the Government's plan, doctors are divided into three classes. Those who have already been in practice are offered refresher courses lasting (if taken continuously) a fortnight. Subsistence and travelling allowances are given, and, where necessary, the cost of a locum tenens is defrayed. But can this fortnight be considered enough? After maybe four, five, or six years' absence from the general run of medicine the practitioner needs not two weeks but two months or more in ward and lecture-room to re-equip him professionally. Usually he is so heavily committed that he cannot afford to spend so long without earning. Without assistance, therefore, he will not get the instruction he requires and would welcome. The effects of this omission will be felt less by the doctor himself than by the public, and on public grounds it is regrettable that those who control official expenditure have so far not been persuaded to offer the demobilised practitioner, in suitable cases, two or three months' re-training while continuing his Service remuneration. The cost to the country would be small, and the profit great.

Better provision has been made for young doctors who joined up within about a year of qualifying. These are offered junior hospital appointments at £350 a year, with an additional £100 where they do not live in hospital, and they can apply for the same allowances as other officers under the Ministry of Labour scheme, though their earnings would be taken into account in fixing the amount of the allowances granted. This offer is generally considered reasonable, though it may be noted that many young men have married during the war and will soon need to find more permanent and lucrative work. They may well wonder how, after 6 or 12 months in hospital, they will be able to bridge the gap until the National Health Service can give them settled employment. One answer which has been suggested is the formation of a temporary pool containing those whose careers will be determined by the new health service. The Government would pay the doctors in this pool and would recover part of the cost from the practitioners for whom they worked as assistants, or from the hospitals where they were employed for the time being.

Finally, we come to the proposals made to the potential specialists. Extra registrar appointments are being made for these at £550 a year, with £100 allowance where the appointment is non-resident. Such appointments are open to those who were training before the Services claimed them, or who are now regarded as suitable candidates for specialties. So far, fair enough. But the doctor who was already established in practice of any kind is specifically excluded, and the posts are therefore closed to many who wish to specialise or to attain recognised qualifications as specialists. If a man practised before the war, his only chance of securing the kind of appointments necessary to achieve specialist status is to compete with the younger generation for the regular registrar posts or to secure one of the similar appointments that may be offered by universities as recommended by the Goodenough Committee. The case has already been recorded [1] of a man who before the war was a general practitioner, but also honorary dermatologist at a large provincial hospital: he decided to devote his whole time to dermatology, but is ineligible for a registrar appointment under the Government scheme. This is possibly an exceptional example; but practitioners who have specialised during their years of service are far from exceptional. Are the fruits of their special experience to be thrown away? The answer officially is: "Yes. For those who were engaged in practice before the war, we can offer no more than a fortnight's refresher course." The assessment is made on pre-war status; which is no more reasonable, and a deal less just, than assessing on his 1939 position the doctor who has since remained in civilian life.

War experience has brought out the value of the specialist and graded specialist in both military and civilian medicine. The country needs specialists at least as badly as it needs general practitioners; and this need will become still more acute if the hospital services are nationalised. ROBB-SMITH [2] has emphasised the importance of using the first three post-war years for the development of specialists and teachers among ex-Service doctors (1) so that they can help in the clinical instruction of an increased flow of medical students, and (2) in order to provide something nearer to a comprehensive medical service,

1. Evans, C. D. *Brit. med. J.* 1945, ii, 585.
2. Robb-Smith, A. H. T. *Lancet*, 1943, ii, 243.

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which, he estimated, would call for over 15,000 specialists in a total of 70,000 doctors. These figures may be too high or too low, but it can hardly be questioned that neglect to make full use of knowledge already gained, or of valuable professional material, is both socially and financially wasteful. The situation at this moment certainly presents difficulties. The shortage of qualified teachers is one for which there is no ready and fundamental remedy, though perhaps the release of those remaining in the Services could still be expedited. An obstacle to the creation of unlimited registrar appointments is the dearth of suitable hospitals; obviously, for full benefit, the trainee specialist should be appointed to one with a good staff. But at least we can and must see that as many posts are provided as the hospitals can sustain with advantage to the holders and without disadvantage to their own efficiency.

It is true that if adequate training for practitioners and potential specialists is introduced the country will be denied their help by so much the longer, at a time when doctors are wanted in practice. Few, however, would care to dispute the ultimate advantage of an instructional period and of developing any special experience and enthusiasm in men returning from the Forces. Though the complete training of specialists is measured in years, revision and expansion of the existing scheme is a necessary first step towards obtaining those that will be needed as soon as we try to provide modern medicine for the whole population. It remains for the profession to convince the Government that this first step is urgent; and that these future specialists will require continued subsidy until they are capable of taking their essential place in the reorganised medical service.

Dangerous Nasal Carriers

EPIDEMIOLOGISTS have long regarded the nasal carrier as a common source of diphtheria in schools and hospital wards. Indeed, in searching for a reservoir of diphtheria infection, it has become the normal practice in this country to take swabs from both throat and nose. Less attention has been paid, however, to the rôle of the nasal carrier in streptococcal outbreaks, although in 1932 GORDON [1] showed that the patient with a purulent nasal discharge following scarlet fever is particularly likely to give rise to "return cases." More recently HARE [2] found that, compared with throat carriers, nasal carriers of hæmolytic streptococci were much more liable to contaminate their environment, while puerperal infection has not infrequently been traced to them. Now HAMBURGER and his colleagues bring forward even clearer evidence of the danger of the nasal streptococcal carrier to his fellows.

Having confirmed earlier observations that streptococcal cross-infection is most often caused by the types prevalent in the air and dust of the ward, and that certain patients tend to contaminate their environment much more than others, they set out to find how the organisms were dispersed from the "carriers," using that word to include any patient in the acute or convalescent stage of streptococcal infection. First they showed that in only about two-thirds of patients with streptococcal throat infection could the organisms be found in the saliva,[3] and that it was seldom possible to correlate strongly positive saliva carriers with a heavily contaminated environment. Later it was noted that patients with acute sinusitis were heavy streptococcal excretors, and nasal cultures were undertaken for all patients admitted with sore throat.[4] For this purpose a slender padded swab was gently pushed into the anterior nares for 3–4 cm., and the amount of growth it induced on a blood-agar plate, preferably containing gentian-violet, was indicated quantitatively: for example, + equals 1–10 colonies, ++ is a moderate growth, and +++ a heavy growth of hæmolytic streptococci. In addition contamination of the bedclothes was assayed by pinning a sterile patch of cotton, 5×3 in., to the undersheet at the level of the chest, leaving it there for 24 hours, and then estimating the numbers of hæmolytic streptococci on it. Samples were usually taken on three or four separate days and the highest reading was regarded as the index of the patient's streptococcal output. With this technique over 80% of "non-carriers" (i.e., those whose nasal swab was negative or +) had fewer than 1000 hæmolytic streptococci on their patches, whereas over 80% of the carriers (++ and +++) gave counts above 1000, 50% counts above 10,000, and 10% counts above 100,000, with a maximum yield in one case of 600,000. Of the whole group two-thirds had positive nasal cultures on admission (a much higher proportion than is usually found among scarlet-fever patients in this country),[5] but after the tenth day only 13% were expelling more than 10,000 hæmolytic streptococci per patch, the level arbitrarily chosen for the *dangerous* nasal carrier. Of 94 patients with positive nasal cultures who were followed up, only 13% were carriers (half of them strongly positive) two months after discharge, although 52% still carried hæmolytic streptococci in the throat. A positive nasal culture was not necessarily associated with sinus infection; thus among 77 strongly positive nasal carriers (presumably in the acute stage of the infection) physical and X-ray examination produced evidence of sinusitis in only 60%: but patients with sinus infection tended to be more prolific and persistent excretors than those with rhinitis only. Patients without rash were as likely to be heavy nasal carriers as those with the scarlatinal syndrome. Air pollution and contamination of the bedclothes with hæmolytic streptococci were very much greater in a ward housing nasal carriers than in a ward where only the throat cultures were positive.

These findings led HAMBURGER and his colleagues [6] to investigate the part played by the nasal carrier in hospital cross-infection and localised outbreaks in camps. In 11 out of 12 ward infections the source was traced to heavy nasal carriers and excretors among the patients. Again, 14 out of 16 instances of barrack infection occurred in barracks where a soldier was found to be carrying the infecting type in his nose, although there were many *throat* carriers of other types in the same barracks. On the other hand, strongly positive nose carriers were encountered in barracks from which no case of acute tonsillitis was reported. That certain individuals are prone

1. Gordon, J. E. *J. Amer. med. Ass.* 1932, **98**, 519.
2. Hare, R. *Lancet*, 1941, **1**, 85.
3. Hamburger, M. *J. infect. Dis.* 1944, **75**, 71.
4. Hamburger, M., Johnson, M. G., Hamburger, V. *Ibid*, 1945, **77**, 68.
5. de Waal, H. L. *J. Hyg., Camb.* 1940, **40**, 172.
6. Hamburger, M., Johnson, M. G., Hamburger, V. *J. infect. Dis.* 1945, **77**, 96.

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to the nasal carrier state was exemplified by a soldier who was responsible for two outbreaks of infection by different serological types, the carrier state being temporarily cured in the interval by a systemic course of sulphadiazine. No abnormality could be found in the nose or sinuses of this man. An outbreak of food-borne tonsillitis was traced to a food-handler who was the only mess employee with a strongly positive nose culture of the infecting streptococcus.

If substantiated by studies on civilian communities these interesting findings should lead towards more rational control of streptococcal outbreaks in hospitals, schools, and institutions which hitherto have largely defied the efforts of administrator and epidemiologist. If the chances of clinical infection are proportional to the number of organisms in the environment, and if the main reservoirs are heavy nasal carriers, then early detection and isolation of these carriers should help in preventing further spread. Again, sulphonamide therapy, either locally or systemically, will reduce or temporarily abolish the nasal carrier state; and it is noteworthy that large outbreaks of streptococcal infection in American camps have been apparently controlled by its use. (When sulphonamides are employed for such purposes the sensitivity of the epidemic strain should first be tested, and the drug should be used in therapeutic doses lest drug resistance develop.) Lastly the risk of spread of streptococcal infection in a heavily contaminated environment can be much diminished by dust-suppressive measures which the Americans, like us, have found effective in streptococcus-infested wards.

Retreat from the Mines

PEACE has not rescued the coal industry from its troubles. "The reason for the shortage of coal," explains the production officer of the National Union of Mineworkers, "is that the mines have not enough men, and in ten years if there are no replacements there will not be a miner left in the country. Normal recruitment is less than 10,000 a year to meet a loss of 70,000 a year." Demobilised miners who could readily relieve the industry's immediate plight are reluctant to return to the pits. Mining no longer has a reservoir of labour in the mining villages. In the years between the wars the industry developed a discontent which was spiritual and psychological as well as economic. The miners reacted in what ways they could—in conflict with their employers, in a drift from the mines and mining districts, in a declining birth-rate, and in a determination that their children's future should lie elsewhere.

Nevertheless the miners' representatives believe that it will be possible so to improve conditions in the industry that enough recruits can be attracted and retained, and they put forward their suggestions in a twelve-point plan.[1] Some of the demands may appear to emphasise the obvious: the first, for example, is that "average wage standards shall not fall below those of any other British industry." Yet before the war miners' wages ranked as low as 86th, and the present basic rates, which are frozen till 1948 at £5 for underground and £4 10s. for surface workers, compare unfavourably with the recent dockers' award. The reasonable claim for two consecutive weeks' holiday with pay has once more, last month, at the eleventh hour, been refused by the mine-owners. As to welfare, a generation which has seen how speedily things are done in war is impatient that 25 years after the establishment of the Miners Welfare Commission some 300,000 men are still without the benefit of pit-head baths. Surprisingly, there is no reference in the twelve points to nutrition. Many miners feel that the almost uniform rationing of the whole population—sedentary and active alike—has not been equitable; and now would be the time to publish any surveys the Ministry of Food has made of consumption by miners, especially by heavy workers among the 30% of all miners not supplied with "full meal" canteens.

The miners propose, rather baldly, a "complete reorganisation of health services," and this accent on health is characteristic of their attitude. In South Wales, for example,

> "the miner has provided his own hospital, financed very largely from his own pocket, in his own township, and easily accessible for his own family. . . . He is aware, too, of the value of a high degree of medical skill and a considerable proportion of the income of the major hospitals . . . is derived from the contribution of the workers in the mining valleys." [2]

In that region, however, the hospital surveyors now present a formidable programme of 10,000 new beds, including at least 500 for tuberculosis. As to industrial health, war-time advances, so notable in the factories, have largely bypassed the mines. It may be that the traditional association of the local general practitioner with the mine will provide a sound basis for a mines medical service. But there is need for clearer definition of the doctor's status and responsibilities, and for an increase in his numbers; all the more so if the isolation of mining communities is to be broken down—a change that is socially so desirable. There is need, too, for better training of the future miners' doctor. Professor RYLE'S suggestion [3] that departments of industrial medicine might be specialised to the industries of their region points to a school of mining medicine centred in South Wales.

The functions of a mining medical service, and the contribution that social medicine can make in the present situation, are soon demonstrated:

> "If we assume a working life of fifty years, then on the average out of 100 miners entering the pit at fourteen, 6 or 7 will be killed in the pit, and 20 very seriously injured. The average miner may expect to be injured fairly seriously once every five years during his working life." [4]

The accompanying table gives a few figures indicating the waste and misery that have driven so many workers from the industry. Even so, the list is far from comprehensive. It does not reveal the disablement from emphysema and other respiratory disorders not coming into the category of pneumoconiosis; or the unenviable record of many mining districts in infant mortality, in death-rates of mothers and young children, in deaths from phthisis and rheumatic heart disease. Many of these problems are being tackled: thus reablement services for the injured miner, pioneered in the Midlands, are now generally established. But some questions do not appear to have

1. See *Times*, Jan. 11, 1946.

2. Hospital Services of South Wales and Monmouthshire, Welsh Board of Health, H.M. Stationery Office, 1945.
3. Ryle, J. A. *Brit. J. industr. Med.* 1945, ii, 108.
4. Heinemann, M. Britain's Coal, London, 1944.

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the attention they deserve. It is hard, for example, to understand why prevention of beat knee is so largely optional; and it may be asked how much more we know today of the causes of excess mortality

Year	1943	1944	1945
Man-power	708,000	710,000	End of year 698,000
"Natural" wastage	38,000	45,000	70,000
"Normal" recruitment ..	12,100	10,400	9000
Accidents incapacitating for at least 3 days	173,716[5]	176,847	..
Fatal accidents	713	623	545†
"Beats" granted compensation	7478	7448†	..
Nystagmus granted compensation	2006	1809†	..
Deaths from silicosis	82*	97*	..
Pneumoconiosis (new cases) granted compensation ..	1322	963*	Jan.–June 30, 2262*

* South Wales only.[6] †Provisional figures.

among the wives of skilled miners than we did in 1938, when evidence of it was first published.

The crisis in man-power is at its most acute in South Wales, where numbers have fallen by a quarter since 1938. Here the miners bluntly equate the unwillingness of men to go down the mines with the prevalence of the dust diseases:

> "It will be realised that with so many persons suffering from the disease (pneumoconiosis) and the resulting insecurity to them and their families, younger men now shun the mining industry as a means of a livelihood." [6]

Recognition of the earlier stages of silicosis has now remedied what miners have long felt was a gross injustice. Fundamental research is proceeding,[7] with allied investigations of dust suppression. Pending prevention, early ascertainment offers the best hope of removing this blight from the industry. The unions are demanding examinations before entry and periodically thereafter,[1 6] which would, of course, include radiography; a point made also by KEMP and WILSON in their study of a coalfield published elsewhere in this issue. Coming from the workers, such proposals are particularly helpful, since examinations imposed from above might be resented. In South Wales, from 1943 to mid-1945, no less than 4267 men, mostly married and with families, were invalided from the industry with pneumoconiosis and silicosis, and last August applications were still coming in at a rate of 130 per week.

> "Whole communities are affected. In some of these a very high percentage of the total male population is affected . . . and in some parts there are whole streets with a victim in every house." [8]

But earlier diagnosis, the needs of war, and the impetus to reablement have completely changed the character of this problem. The great majority of the miners now being invalided are only partially disabled and are fit for work in light industry near their homes. With the end of fighting in Europe such employment became harder to find; but the Government have since stepped in with practical proposals.[9] Factories are to be built at five focal points in South Wales and leased to suitable private firms at half the normal rent on condition that at least half their employees are men on partial compensation for pneumoconiosis. The more seriously incapacitated are the concern of the Disabled Persons Employment Corporation, Ltd., which is planning a wide range of suitable occupations with the establishment of small centres in seven districts.

When all this has been considered—and the twelve-point plan is concerned also with the equally vexed issues of safety, compensation, pensions, the 7-hour day and 5-day week; the lack of amenities and often the appalling housing of mining villages—much that matters still remains to be said. The industry will not be saved by bread alone, nor by the technical overhaul which seems long overdue, nor by nationalisation in itself. The truth must be faced that in the past the community has not appreciated the miner, or his services, at their real worth. And this moral factor has been responsible as much as anything for the retreat from the mines. This retreat demonstrates what may prove to be a crucial problem of planned economy—the supply of man-power to key industries which are unpleasant and regarded as socially inferior. If a democratic solution is preferred to "direction" and compulsion, the whole community must contribute by discarding an antisocial scale of values of which the disrepute attaching to mining is a leading symptom. The esteem of fellow citizens, pride in tasks achieved, and social prestige, are incentives for which our wasteful peace-time economy had small need. We are coming to realise that in the age of full employment economic freedom can be preserved only if such incentives are allowed full scope, and if many occupations are, for the first time, accorded a social status which truly reflects their value to the community.

The Choice of a Mate

THE study of marriage and human sex life has for some years been a favourite subject of research in the United States, but only recently has its importance come to be recognised in this country. At this moment a census is proceeding in a large sample of our population, from which essential data on the size of the present-day family, the age of marriage, and the spacing of births will be obtained. The effects of a greatly diminishing birth-rate and a dwindling and ageing population have to be faced, and a reliable knowledge of demographic trends is vital for doing so. Against such a setting, the more intensive study of restricted samples can provide useful information, and Dr. ELIOT SLATER on Jan. 15 gave the Eugenics Society an account of findings in a strictly limited investigation of this kind. The subjects were serving soldiers and were drawn in equal numbers from the neurotic and the general wards of an E.M.S. hospital. All were married, and their wives were living in accessible parts of Greater London. The sample is therefore limited in age-distribution and in the economic class represented, and is wholly urban. From the men and from their wives alike a psychiatric social worker took the

5. Fisher, S. W. *Proc. R. Soc. Med.* 1944, **38**, 59.
6. National Union of Mineworkers, Report of Compensation Department, Cardiff, 1945.
7. See *Lancet*, 1945, ii, 437.
8. Amalgamated Anthracite Combine Committee, *Memorandum* quoted by Rev. J. Baker, *Manchester Guardian*, Dec. 18, 1945.
9. Cmd. 6719, H.M. Stationery Office, December, 1945.

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story of the family, of the subject's childhood, hool, and occupational career, and of the marriage. One of the points that emerged was that in this mple, as in all others so far investigated, the nenomenon of assortative mating was apparent. en and women have no common standard of what liked in the opposite sex, and people are most rongly drawn to others who resemble themselves. ke tends to mate with like, whether it be in such ysical characteristics as colour of hair and eyes, in ental qualities such as intelligence and temperament, in sociological matters such as religion, occupation, bits, and interests. This has a wide significance r a great variety of problems, from the mode of heritance of certain bodily and mental disorders the theory of evolution in human populations. ssortative mating produces effects like those of breeding; it increases human variability and eeds up the action of selective forces. It is believed, om the work of GODFREY THOMSON and FRASER OBERTS, that a differential birth-rate is associated th intelligence; the more intelligent half of our pulation probably has a lower birth-rate than the s intelligent. The difference is calculated to be g enough to produce a perceptible drop in the erage intelligence of the population from one neration to the next. Assortative mating would nforce this disastrous tendency; for, if two intelli-nt people marry each other, a restricted fertility ects the issue of both. A eugenist might draw ne cold comfort from the finding, in this sample, at the neurotic were slightly less fertile than the ntrol subjects, and that assortative mating may be ther more intense among neurotic families than in e population at large. If confirmed, it is certainly portant that neurosis was found twice as often ong the wives of the neurotic as among the wives the normal patients.

People are not as a rule consciously aware that ey are attracted to those who resemble themselves. s. WOODSIDE, the psychiatric social worker who nducted the field work in this study, made it clear w vague and arbitrary are the points on which en and women can put their fingers when asked to ve a reason for their attraction. They were thrown gether by casual meetings at places of entertain-nt, or at work, or less frequently by having common ends. The initial attraction might be in face or anners; but the ties that kept them from drifting art were more likely to lie in similarity of back-ound, interests, and intelligence. About half the en and a fifth of the women admitted to sexual ations before marriage. But the satisfaction of xual needs was not a dominant interest; and nerally throughout the group the main reason for rriage was the desire for the comforts of a home. out 90% of these families practised some form of ntraception, of which by far the commonest was o the most ancient and primitive. Ignorance on s, as on other topics connected with the sexual life, s widespread and profound. The majority of sbands and wives did not feel able to discuss oblems of this sort between themselves. The need "sex education" for young people and in the ools has lately been brought into prominence by ucationists, and the findings of this investigation er them further support.

Annotations

ACROSS THE CHANNEL

Two small books have lately been issued with the object of compelling the public to think about conditions on the Continent today. One of them [1] consists simply of a dozen photographs, representing children in various stages of emaciation. Its companion volume,[2] which has no illustrations, is a sober and substantially a correct statement of problem and solution, as they have developed side by side since the war began. That the British Government has been placed in a serious dilemma has been evident for the last year or more. Without our food imports we should soon be reduced to below the calorie level of the urban French. How far are we justified in maintaining ourselves at well above that level? We, but not the French or the Poles, are represented upon the Combined Food Board, which still controls in some measure the allocation of the bulk of the world's exportable surpluses of food. By right we attained our position early in the war upon the board; do we still hold it by right, to the exclusion of the liberated allies? A departmental separation of functions enables our Minister of Food to say with perfect frankness that his task is to keep this country well fed. Certainly that is true. But it may equally be the function of the Government as a whole to lead the people into a mood of self-abnegation. For the world beyond our shores the laurels of Dunkirk and of the Desert are beginning to dim as they pass into the perspectives of history. To what new laurels shall we now look?

Such are at least a few of the questions that arise as one peruses the two books. They are questions that need to be answered; and those who wish to bring them before their friends or their audiences will find here sufficient material in figures, dates, and apt quotations.

TRAUMA AND EPITHELIOMA

EVER since improvements in microscopical technique enabled Johannes Müller to distinguish inflammation from neoplasia, clinicians have asked why cancer should appear as often as it does in tissues which have been inflamed. Some association between the two conditions is manifest from the occurrence of epithelioma in scars, chronic ulcers, fistulæ from diseased bone, and other lesions involving the skin, and this association has led to an excessive emphasis being laid on irritation as a cause of cancer. Today we know from experiment that chronic irritation of a tissue in the absence of a specific agent will not induce a malignant growth, whereas some chemical substances will predispose the skin to cancer,[3] so that a new growth may arise in the region acted on by the carcinogen long after its application. The creation of a precancerous field in this way is comparable to the phenomenon in which a certain region of the embryo, without any visible change, becomes destined for a specific form of development. For example, the field where a limb will come does not display any visual evidence of its capacity before the limb itself begins to appear. A similar comparison can be drawn from sexual biology, in which the specific sensitivity of a field to a gonadal hormone cannot be foretold except by its anatomical situation.

The effect that inflammation may exert in a tissue already predisposed to cancer by a carcinogen has been and still is a subject for research. The following facts have been established in the laboratory: (1) that inflammation by itself does not cause cancer; (2) that a predisposed tissue may more speedily become cancerous

1. Is it Nothing to You? Victor Gollancz. London: Gollancz. Pp. 16. 4d.
2. They Must Not Starve. Potiphar. London: Gollancz. Pp. 107. 3s. 6d.
3. Willis, R. A. *Cancer Res.* 1945, 5, 469.

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if inflamed; (3) that a circulating carcinogen may become concentrated in an inflamed tissue; (4) that when applied directly to an inflamed surface a carcinogen may be retained there; and (5) that the appearance of a tumour in an already predisposed tissue may be accelerated by inflammation of that tissue. Pullinger [4] has recently described some experiments in which she combined small excisions of skin with applications of 0·05% benzpyrene to the same areas on the mouse's back, and her results support the conclusion of other workers using other methods that repeated inflammation encourages the development of epithelioma in skin which has been subjected to a carcinogen. She found that a single excision combined with applications of benzpyrene increased the tumour-incidence by less than 1%, whereas multiple excisions in otherwise similar conditions caused a twofold or threefold increase in the incidence of tumours.

To the references which Pullinger has appended to her useful papers might be added Burrows's summary of information on the localisation of substances from the blood-stream by inflamed tissues [5] and Brunelli's papers on the concentration of intravenously given œstrone—itself a carcinogen—in the inflamed subcutaneous tissues of the rabbit.[6]

AN ARCHITECT'S VIEW OF A HEALTH SERVICE

WE are beginning to realise that pooled experience derived from many minds can often turn out a better job than the limited experience of one mind, or even of one trade or profession: Mulberry and Pluto showed as much. Nowadays housewives are being asked their opinion about the convenient placing of household equipment, teachers offer their views on classroom design, and doctors often describe their ideal health centres. Mr. Hjalmar Cederström, chief architect of the Southern Hospital, Stockholm, whose article on planning a hospital service appeared in our columns last year,[7] has lately published in a Swedish journal [8] his views on the part this great hospital may hope to play in the health service of his country, not only as a centre of social welfare but also as a model for other regions and perhaps for other countries. The Southern Hospital—the Södersjukhus—is designed to be comprehensive, offering preventive and welfare advice, treatment for both acute and chronic cases, and aftercare. This presents special problems for the architect, who must have in mind both administrative convenience in designing his blocks and also the dangers of infection which arise when large numbers of people are gathered together in buildings. Cederström thinks there should be two main blocks, one for examination and treatment, and one for bed-patients. The outpatient department should be in the treatment block, outpatients needing special investigations travelling vertically to the various departments by lifts or stairways. The bed-patients visit the same departments, but travel there horizontally along corridors from the bed block, and the paths of the two groups of patients never cross. In the same way, the wards in the bed block belonging to the ear, nose, and throat department are connected by a separate corridor with the operating-theatre in the treatment block. As he points out, these special plans for limiting the risk of infection as far as possible are bound to raise building costs; but he thinks them a good investment. He considers that once the diagnosis has been made, and treatment established, inpatients should be transferred to aftercare blocks in the hospital grounds where treatment can be continued; and such blocks, he says, can be inexpensively run. The suggestion is tempt especially where the hospital stands in open airy coun as the Södersjukhus does; but it would be difficul apply in our crowded metropolitan hospitals where sp is at a premium and it is hard to find enough room e for acute cases.

Cederström goes on to suggest that an experiment social security should be tried in a social investigat district—what he calls a "social city"—where pec should be distributed according to their occupati and social diseases—textile workers with tubercul being grouped together, for example. He seems advocate that village communities, like Papwor should be formed in different parts of the city, but does not develop this interesting proposal at all ful On the face of it, the experiment could only succeed tried in an unnaturally docile and coöperative society

4. Pullinger, B. D. *J. Path. Bact.* 1945, **57**, 467, 477.
5. Burrows, H. Some Factors in the Localisation of Disease, London, 1932.
6. Brunelli, B. *Arch. int. Pharmacodyn.* 1935, **49**, 214, 243, 262, 295.
7. *Lancet*, 1945, ii, 571.
8. *Svenska Läkartidningen*, Nov. 30, 1945, p. 3005.

DAMAGES FOR SHOCK

SINCE the Medico-Legal Society last considered t question of judicial damages and compensation nervous shock, the courts have several times had brought to their notice.

In the discussion held by the society on Jan. 24 t present position was reviewed. Judge W. G. Earenge K.C., recalled that the foundation of all damages is th if one person in breach of his duty to another caus damage to the other, he is liable to pay compensatio The cause of action relied on is nearly always negligen —the breach of a duty to take care. The test of culp ability is whether an ordinary reasonable person wou have foreseen that the act or default might probabl cause damage. The earlier attitude of the law wa that it could not value mental pain or anxiety an would only award damages for a material injury. Th decisions of the last generation, culminating in the Hou of Lords case Hay *v.* Young (1943) A.C.92, have mad mental or nervous injury as good a ground for a clai as physical injury. In both classes of injury super sensitivity only comes into account in so far as the cour must be satisfied that an ordinary average person woul have suffered some damage; if he would, then com pensation is based on what the supersensitive perso actually suffered and not what an ordinary person woul have suffered. The present position, as stated by Judge Earengey, seems to be that a wrongdoer should foresee the risk of shock to a person within the area o potential danger caused by reasonable fear of danger o injury to that person or to his close relations. The recent Australian Act establishing nervous shock as a cause of action lays down a long list of relatives, fea for whose safety may be the cause of actionable shock— a list roughly corresponding to the degrees of affinity within which marriage is prohibited.

Mr. Zachary Cope, dealing with the medical aspect emphasised the misfortune by which the word "shock," which has become familiar as meaning a condition o lowered vitality resulting from the application of harmfu stimuli to the body, has been attached by lawyers to th entirely different condition which he regards as practicall identical with anxiety neurosis. Mental shock, he said is rare in persons who have suffered severe physica injury, common in those who have suffered none. It is increased and prolonged out of all proportion by th suspense associated with litigation, and seldom develop after accidents in which no question of compensatio arises, or in persons who are completely responsible fo the mishap. The average person does not, Mr. Cop believes, develop mental shock merely from seeing o hearing something terrible on one occasion. Thos who framed the Emergency Legislation had wi advisers, he thought, when they decreed that the Sta should not compensate for war injuries which were no physical. He sees need, in the assessment of damag

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for mental pain and anxiety, for a skilled psychiatrist of long experience who can estimate the nature and degree of the disability and its probable duration. Difficulty in assessing damages, as Sir Roland Burrows, K.C., observed, is no good reason why damages should not be given if someone by a wrongful act causes in somebody else, to whom he owes the duty of care, an anxiety neurosis.

The position therefore seems to be that, by whatever name the mental or nervous injury is called, it is at times a real injury for which the law ought to award damages when the person causing it is legally culpable. In determining, however, whether a compensable mental injury has been caused, and to what extent it is due to the wrongful act of another, and what it is worth in terms of money damages, the court is really almost entirely in the hands of the medical witnesses. One of the reasons why the courts are still groping in more than semi-darkness in dealing with such claims is unfortunately the paucity of medical understanding of the mental facts. If psychiatrists were available who could give a sensible estimate of damages, the courts might, as they have the power to do, use them for that purpose. The trouble is that the psychiatrists themselves are by no means on firm ground. The problem is not an academic one, for neuroses, and hence susceptibility to nervous injury, are steadily increasing in the population. One great advance would undoubtedly be to get rid of litigation in this connexion. If persons who were mentally injured by accident could avail themselves at once of proper medical treatment and no question of compensation arose, there would be far less residual nervous injury. The ideal may be that the State should undertake the reablement of the victim and that the wrongdoer should pay compensation to the State. Such an arrangement, however, lies in the unpredictable future, and for the present it is incumbent on psychiatrists and others to study the syndrome of nervous shock at first hand so that they are able to enlighten the court more precisely about its importance in a given case.

DIAGNOSIS OF RHEUMATIC FEVER

THE querulous comment is often heard these days that "rheumatic fever is changing," and the papers by Barber and Sheldon in our last issue might be held to give substance to this belief. The truth is that the use of diagnostic labels changes, and that, with the growth of knowledge, the symbol "rheumatic fever" has come to embrace a far wider range of disease-pictures than it did thirty years ago.

It is believed today that a patient suffers from this disorder because his tissues react to infection by the hæmolytic streptococcus in a different fashion from those of other people. The manifestations are thus allergic and, since many of the general features of the allergic reaction are non-specific, it would be surprising if similar syndromes, unrelated to streptococcal infection, were not encountered. Sheldon has reminded us that tuberculosis may elicit such a response, a fact less well known, perhaps, to British than to French clinicians. It has been noted too with syphilitic infection; and there are parallels in the common serum-sickness and in the syndrome of bronchial asthma with polyserositis, myocarditis, and polyarthritis described by Harkavy[1] in 1941. Through this familiar guise of the allergic reaction can be seen other features, the sign manual of the specific allergen responsible; to identify this agent in the patient confronting him is the task of the physician. There is usually no difficulty in the diagnosis of rheumatic fever, and a recent history of infection of the upper respiratory tract may facilitate diagnosis when the clinical picture is unusual. Barber reminds us that the hæmolytic streptococcus commonly gives rise to pharyngitis two or three weeks before the appearance of rheumatic symptoms. When "rheumatic fever" occurs below the age of five years, or when pericardial effusion and polyarthritis are not accompanied by endocarditis, suspicions should be entertained of the allergen being the tubercle bacillus or its product. Sheldon's experience well illustrates this point; it also illustrates the renaissance of the "constitutional" concept in medical thought—the diseased body, no longer a passive substrate for the pathogenic agent, is allowed full partnership in determining what form its malady shall take.

1. Harkavy, J. *Arch. intern. Med.* 1941, **67**, 709.

BERNHEIM'S SYNDROME

CONTINENTAL (especially French) and South American clinicians have for long attached importance to a syndrome first described by Bernheim[1] in 1910. This syndrome, sometimes referred to as "isolated right heart failure," is characterised by systemic venous congestion without pulmonary congestion, and occurs in patients with left ventricular enlargement from any cause, such as hypertension, chronic nephritis, or combined aortic and mitral valvular disease. Bernheim's attention was first drawn to the condition by his finding at necropsy that many patients who had died with the classical manifestations of right-sided heart-failure had stenosis of the right ventricle, and not dilatation as would be expected. In all these cases there was hypertrophy and dilatation of the left ventricle, and the stenosis of the right ventricle was due to encroachment of the hypertrophied interventricular septum; so pronounced was this encroachment in some cases that the septum almost touched the lateral wall of the right ventricle. Clinically these patients show signs of systemic congestion in hepatic enlargement and distended neck veins, with œdema which is often gross, but have no pulmonary congestion or dyspnœa except as terminal phenomena. Bernheim explained these findings on the basis of obstruction to the blood-flow through the right ventricle.

Of three examples of this syndrome reported by Russek and Zohman,[2] two were diagnosed during life and one at necropsy. The two cases diagnosed clinically were both in hypertensive subjects, and the third was a case of combined aortic and mitral valvular disease. In spite of their œdema and venous congestion these patients could lie flat in bed and engage in moderate activity without much respiratory distress. The combination of a raised venous pressure with a normal arm-to-tongue circulation-time is an important diagnostic feature. In spite of the clinical evidence of left ventricular hypertrophy, the electrocardiogram shows either right ventricular preponderance or no axis-deviation. Radiologically, enlargement of the left ventricle and right auricle is highly suggestive.

The curious lack of British and American references to this condition is difficult to explain, especially when an experienced clinician such as Fishberg[3] refers to the "many necropsies" in which he has noted well-marked narrowing of the right ventricle by a bulging septum. Fishberg has gathered the impression that the syndrome is commoner in young subjects than in elderly ones, and both the cases diagnosed clinically by Russek and Zohman were in their early forties. Probably the post-mortem finding of a "stenosed right ventricle" is much more common than functional obstruction to the blood-flow.

1. *Rev. Médecine*, 1910, **30**, 785.
2. Russek, H. I., Zohman, B. L. *Amer. Heart J.* 1945, **30**, 427.
3. Fishberg, A. M. Heart Failure, London, 1940, p. 447.

Sir JOHN BROADBENT, consulting physician to St. Mary's Hospital, died at his home at Wendover on Jan. 27. He was 80 years of age.

Major-General EDWARD PHILLIPS, C.B.E., D.S.O., M.C., director of medical services, 21st Army Group, has been promoted K.B.E.

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Special Articles

SOCIAL ECOLOGY OF THE RADSTOCK COALFIELD

F. H. KEMP
M.B. Birm., M.R.C.P., D.M.R.

DAGMAR C. WILSON
M.D. Glasg., M.R.C.P., F.R.C.O.G., D.P.H.

From the Institute of Social Medicine, Oxford

IT is generally accepted that the evaluation of the nutritional status of a community should include assessments of the environmental conditions under which individual members live and work. During a nutritional investigation in Somerset we learnt that Mr. Frederick Swift, J.P., until recently the miners' agent, had since 1921 pointed out that mine-workers on the Radstock coalfield suffer from a pulmonary disability, and we have made a preliminary study of this area.

The Somerset coalfields, with at present 10 main collieries, is situated in the north-east of the county within a radius of about 15 miles of Radstock and includes a number of scattered villages and hamlets. The population is about 15,000, of whom about 3000 are miners. The district is deeply dissected with steep hills and narrow valleys, and the land is both arable and pasture. Mines may be situated near dwellings or isolated in the midst of fields. Small derelict workings are scattered over the countryside where in the past coal has been mined.

The community includes both miners and agricultural workers and there is a mining tradition in certain families. There is no special housing for miners. Agricultural labourers have earned less than miners in the past and miners' homes are generally more comfortable. Some miners own their houses. A miner may live from 1 to 5 miles from the mine which he may reach by walking, by pedal cycle, or by bus. Many prefer to go to work early so that they can return in the afternoon and garden while it is still light. Hot midday meals in the mine canteens are not popular and most men prefer to enjoy their own greens and vegetables at home. They appreciate the meat and margarine sandwiches on sale in the pit-head canteens and their extra weekly ration of cheese, equal in amount to that provided for agricultural workers (12 oz.).

Most homes have facilities for heating water, and miners off duty can be clean and tidy, but where pit-head baths are provided they are much appreciated. Miners are allowed 10 extra clothing coupons a year; in addition men working in very hot seams get what is sometimes called an "iron ration" of trousers.

CONDITIONS OF EMPLOYMENT

It is a paradox that mining conditions in the Radstock district are unhealthy because it is considered a "safe" coalfield. The average coal seam is not more than 2 feet in depth; even 11 inches has been mined, but 14 inches is usually the lowest limit. The amount of under-cutting of coal is limited and there are consequently few mining accidents. Firedamp, except in two collieries, is rarely found in these mines with the result that special precautions to ensure good ventilation have not been considered necessary. Some seams of coal of high phosphorus content containing fluorine are present in this area; such coals are being increasingly employed in industry (Crossley 1944).

The amount of dust to which a miner is exposed depends on the situation where he is working and on the facilities for ventilation at the site. Rock drilling produces much dust; often bands of hard sandstone ("greys") are encountered which cause the silica dust. In this area the components of the dust at the coal-face of different seams within one mine may vary considerably. Available data (Committee on Pulmonary Disease 1945) suggest that the action of silica on the lung tissue may be accelerated or retarded by other components of the coal-dust.

In general, lighting is by acetylene lamps. In some positions in the mines ("dead ends") the air is sufficiently foul to put out a naked candle. Many seams are extremely hot so that men take two changes of trousers to their work. This heat is not solely due to depth, for the deepest working is not more than 2000 feet, and is probably due to bad ventilation. Certain seams are notoriously dusty, and till recently there has been little watering of the coal-face. For surface workers there is much dust near the coal screens. Theoretically protective masks should be worn, but there is a strong prejudice against their use.

Typically a miner starts work on leaving school at 14 (formerly at 12 years). He used at first to help with the pit ponies and later put on the "gus" or waist-band and hauled coal. Now lads are usually employed in moving tubs along to the main haulage (endless rope). Finally, at about 19, they start work on the coal-face. The length of an average working day is 8 hours, of which 7½ hours is spent underground. Since 1941 miners have had a week's holiday with pay every year.

In 1918 over 500 local lads were employed but in 1944 there were fewer than 50 and boys from other areas had to be "directed" to this coalfield. Attempts to overcome shortage of man-power and to speed up production by substituting mechanical for man haulage, increasing conveyor belts, and using mechanical drills is stated to have made the mines more dusty. The thinness of the coal seams and the numerous faults make provision of the additional ventilation which should accompany mechanisation both technically difficult and costly. Some pits still use primitive fire ventilation instead of fans.

NUTRITIONAL STATUS

Observations were made during visits to the homes of miners and of people living nearby who were otherwise employed, using methods for field investigation already described (Wilson and Widdowson 1942). The inquiry among the miners was based on experience in other coalfields (see Government of India Bulletin of Indian Industries, no. 31).

The nutrition of miners' wives and children was compared with that of the families of agriculturists. There was no apparent difference; in both groups some housewives were assessed as nutritionally subnormal and some children showed the signs of former rickets. Mine workers, however, compared with agricultural labourers were often flat-chested. Some men were aware of this difference, which they ascribed to the cramped attitudes necessitated by work in very narrow coal seams. By contrast miners' sons who had chosen other forms of employment were in general well developed. The number of tuberculosis notifications for this area of Somerset is low and tuberculosis is not specially associated with pneumoconiosis. In the Norton-Radstock district (population 11,600) of this area only one miner has been notified since 1942.

Dental fluorosis of mild to moderate degree was present throughout the area. The sources of water-supply include the main council supply from springs in the Mendips, local shallow wells, and water pumped up from mines. The fluorine content of these drinking-waters varied from 0·2 to 0·3 part per million. Somerset lies within the region of goitre endemicity described by Stocks (1928) where many drinking-waters are of low iodine content (Young et al. 1936). Cases showing a moderate degree of thyroid enlargement were observed in the immediate vicinity of Radstock town; the glands were examined according to the method described by the Goitre Subcommittee (1944).

These Somerset miners share the calm outlook of their community. They do not suffer from nystagmus although they work in strained positions. They have come to consider dust a necessary accompaniment of their work, and pneumoconiosis as an inevitable hazard. They first become aware of breathlessness when going up inclines but customarily continue at work until they can no longer walk.

The amended silicosis legislation of 1943 is a great advance on the Statutory Rules and Orders of 1931, but it is not good enough to ensure that the men get a fair deal. The validity of a claim for compensation is decided mainly on the radiological appearances of the suspected person's chest, and this practice, in our opinion, is hard to justify. We question whether there is any convincing proof that the changes revealed by X-rays can be held directly responsible for the symptoms of which the men complain. Very fine fibrosis leading ultimately to respiratory and circulatory embarrassment

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and death is not necessarily distinguished in a radiogram of the chest. Moreover, miners with increasing breathlessness may still fail to give the radiological appearances which are generally accepted as evidence of pneumoconiosis. As things are, however, it is not surprising to find that panel doctors are sometimes unwilling to refer men to the Silicosis Board unless they have convincing radiographic evidence of frank changes.

In these circumstances if a miner wishes to press a claim the onus of so doing rests on himself. His association, which has to bear the cost incidental to the procedure, will not willingly support an application unless there is a reasonable chance of success. After a miner's death it is possible for his relatives to ask for a post-mortem examination, and if silicosis is found compensation up to £400 is paid to his widow, plus payments for dependent children under 15 years of age.

Records in the office of the Somerset Miners' Association, which date from 1930 and cover 11 collieries, contain the names of 208 miners who had appeared before the Medical Board, of whom 75 had been certified as suffering from pneumoconiosis; 26 of these had subsequently died and 4 of those not certified were also dead. An additional list includes 42 men who had recently appealed to the Board but had not been certified and others who were still awaiting examination.

H. H.'s family history shows the results of working on one particularly dusty and ill-ventilated coal seam. H. H., now aged 45, suffers from severe breathlessness even at rest. He went into the pit at 14. He ceased work 8 years ago when he could no longer walk in the mine. He was not certified under the previous silicosis legislation but was compensated under the more favourable pneumoconiosis regulations of 1943 and receives 15 shillings weekly. On his death his wife should receive £250 as compensation. H. H. states that his father was certified as a case of silicosis; one brother was certified at 40 and died at 48; another brother certified at 43 is alive, now aged 48.

Through the courtesy of Radstock medical colleagues we have studied the radiological findings of a number of cases of chronic pulmonary fibrosis and found that many showed well-marked changes in the lungs. In addition, three miners aged 31, 34, and 40, who considered themselves healthy, volunteered for examination at Oxford and were investigated by the same procedure and at the same time as a group of men exposed to the risk of boiler cleaning (Cook, Kemp, and Wilson 1945). Of the three miners, the radiograms showed in one case very slight changes of a reticular nature; another showed coarse reticulation of the lungs. Radiograms of the third man, who had for the past 5 years been drilling and blasting sandstone but had always taken care to wear a mask, showed little change. In all three cases screen examination of the chest showed an expansion within normal limits. The first two men belonged to Somerset, the third to South Wales.

Thus our findings leave us in no doubt that miners in the Somerset coalfields sustain real pulmonary damage. The fact that only about a third of those who are notified are awarded compensation deserves serious consideration. It is true that some of these men may be suffering from conditions other than pneumoconiosis, but it is a moot point whether this view should be accepted without full and repeated examination of all the facts. Our conclusions are that there should be much better definition of the methods which are at present used for the detection of pneumoconiosis and that there is great need for stricter criteria in diagnosis. In justice to the miners, if one of them complains of increasing breathlessness he should not be held to be free from pneumoconiosis on the findings of a single examination. He should have the benefit of re-examinations at not less than six-monthly intervals over a number of years, and there should be every facility for this to be done efficiently. When the man dies, the family practitioner should be encouraged to ask the coroner for a post-mortem examination and this should be conducted by an expert pathologist.

SUMMARY

The social ecology of a circumscribed area of Somerset, the Radstock coalfield, has been studied and a rough comparison made between the status of mining and of agricultural families belonging to the same community.

The general nutrition in both groups was satisfactory, but among the miners there appears to exist significant degrees of physical defect and disability dependent on their working environment and conditions.

The findings here recorded constitute no more than a very superficial survey. It may be claimed, however, that such a survey justifies itself by providing a case for more detailed sociomedical and statistical studies of sickness in relation to work, habits, and environment in an area of this kind and on the following main counts:

1. The working community selected for study is self-contained and of old standing and has a constitution relatively little complicated by population shifts and admixtures, and the coexistence of multiple trades and occupations encountered in heavily urbanised and industrialised areas.

2. It includes for comparison (*a*) a mining and (*b*) an agricultural group, working in close proximity in the same general environment and with comparable housing conditions.

3. The existence of pneumoconiosis in the mining community is demonstrated, although (partly perhaps because the area is small and isolated) it has not attracted the attention accorded to the South Wales minefields.

4. The contacts established indicate that in any more detailed survey of this area and of these communities valuable collaboration could be expected from medical practitioners, trade union officials, the workers themselves, geological experts, and others.

These data were collected incidentally during investigations on endemic fluorosis for which assistance is received from the Medical Research Council and in which one of the authors (D. C. W.) is associated with Dr. Margaret Murray. We are indebted to her for examination of the fluorine content of Somerset waters. Mr. F. B. A. Welch's specialised knowledge of the Radstock district was made available through the courtesy of the Director of the Geological Survey.

REFERENCES

Committee on Industrial Pulmonary Disease, Medical Research Council (1945). *Spec. Rep. Ser. med. Res. Coun., Lond.* no. 250.
Cook, K. J., Kemp, F. H., Wilson, D. C. (1945) *Publ. Hlth*, **58**, 123.
Crossley, H. E. (1944) *J. Soc. chem. Ind.* **63**, 289.
Goitre Subcommittee, Medical Research Council (1944) *Lancet*, **i**, 107.
Stocks, P. (1928) *Quart. J. Med.* **21**, 223.
Wilson, D. C., Widdowson, E. M. (1942) Indian Medical Research Memoirs, no. 34.
Young, M., Crabtree, M. G., Mason, E. M. (1936) *Spec. Rep. Ser. med. Res. Coun., Lond.* no. 217.

A CANCER SERVICE IN LONDON

SOME time ago the governors of the Royal Cancer Hospital (Free) decided to expand its internal organisation, and to proceed with plans for collaborating with a number of other London hospitals in cancer diagnosis and treatment. One of their objects was to place the exceptional resources of the hospital at the disposal of the patients and staffs of other hospitals, while another object was to obtain more cases of the less common forms of cancer, both for research and in order that methods of treatment might be tested and developed.

Negotiations were accordingly opened with the following hospitals, most of which had been coöperating with the Royal Cancer Hospital in an unofficial manner for a number of years: the Hospital for Consumption and Diseases of the Chest, Brompton; the Chelsea Hospital for Women; the Gordon Hospital for Diseases of the Rectum and Colon; the Princess Beatrice Hospital; the Royal Free Hospital; the Royal London Ophthalmic Hospital; the Royal National Throat, Nose, and Ear Hospital; and the West End Hospital for Nervous Diseases. A general procedure agreeable to all was evolved.

Patients are examined at a consultation clinic at the coöperating hospital by a team comprising a physician and/or a surgeon and a radiotherapist; often with a clinical research assistant in attendance. The main lines of treatment to be adopted are laid down, and the full resources of the whole group of hospitals are then available for carrying it out. Surgical treatment is usually undertaken at the coöperating hospital, but patients may be transferred freely from one hospital to another for surgery, radiotherapy, or chemotherapy, according to the location of equipment or facilities.

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Certain subsidiary arrangements have also been made:

All beds in the Royal Cancer Hospital have been pooled, and all members of the cancer team (physicians, surgeons, and radiotherapists) have equal privileges in the admission of patients.

Members of the staffs of some of the coöperating hospitals have been appointed to the staff and medical committee of the Royal Cancer Hospital. This arrangement is reciprocal.

A coöperating hospital committee has been set up, with Lord Horder as chairman, to coördinate the cancer work in the group of hospitals, and to advise as to its future expansion.

The number of new cases seen per annum by this (experimental) cancer service has already passed the 2000 mark, which is stated to represent approximately the incidence of cancer in a population of 2 million. Further expansion is at present limited by the number of beds that can be provided. Striking features of the service are that it is designed to deal with any form of cancer and that it recognises no geographical limits, taking no account of the patient's place of domicile.

DOCTORS IN L.C.C. SERVICE

SIR ALLEN DALEY'S ADDRESS

AT the end of its first year the Medical Society of the London County Council Service is flourishing with over 300 members. The presidential address given on Jan. 9 by Sir Allen Daley, county medical officer for London, followed good precedent by containing a retrospect and a prospect. The latter, as he regretfully indicated, was somewhat limited by the obscurity surrounding plans for the National Health Service; but the backward view over the war years included grounds for very real satisfaction.

The society developed in 1944 from a previous clinical research committee. Both, said Sir Allen, were manifestations of a vitality and initiative with which whole-time officers were not always credited and which had led not only to professional work of the highest standard but also to important research. Among contributions made by L.C.C. doctors he mentioned the observations of Sir Frederick Mott and Edward Mapother on the neuropathological and clinical aspects of nervous disorders, of Mary Walker on physostigmine in myasthenia gravis, of J. M. Alston on Weil's disease, of L. F. Hewitt on oxidation-reduction potentials, and of F. H. Bentley on artificial pneumothorax, while the work of Geoffrey Keynes on thymectomy for myasthenia was done with J. F. Piercy at New End Hospital, and that of Laurence O'Shaughnessy on the surgery of cardiac ischæmia with H. E. Mansell at Lambeth. Units have investigated the reablement of children with cerebral diplegia and the Kenny technique in poliomyelitis, and much original work is now in progress. During the war other authorities made wide use of the L.C.C.'s medical staff: the medical supplies of the E.M.S. hospitals and then of UNRRA came under the skilled control of a L.C.C. medical officer; others had gone to the hospital branch of the Ministry of Health, to UNRRA, to the civil affairs division of SHAEF, and as expert investigators and epidemiologists in the Channel Islands and elsewhere, and the L.C.C. service had supplied a group hospital officer in the E.M.S. scheme, the director of the London region ambulance service, and the director of the Central Pathological Laboratory of the National Public Health Laboratory Service. During the air-raids there were no less than 760 "incidents" involving all but three of the council's 97 hospitals, causing damage to the tune of £2,600,000 and putting 5000 beds (2000 of them beds for acute cases) permanently out of action. Many thousand more beds were temporarily out of commission, but the service carried on and could say that no urgent case was refused admission. The story was at one and the same time cause for hope in the future and for pride in the past. The spirit which surmounted so triumphantly the difficulties of the war period was equally capable of coping with those lying ahead.

Turning to this somewhat nebulous future, Sir Allen commended the work of the hospital surveyors of the London region (Sir Archibald Gray and Dr. Andrew Topping) and expressed his support for the conception of hospital districts in which all general hospitals in the district would be closely linked to one main hospital by common staff ties. London, with its numerous complexities, appeared to need 21 such districts, in not a few of which the main hospital would be a L.C.C. one. In the hospital world the days of laisser-faire, of unfettered individualism, and of unregulated competition had surely gone. The best use of available and future resources and the good of the patient both necessitated partnership and planning. The L.C.C.'s general hospitals would certainly require properly planned outpatient departments, together with the necessary medical, nursing, and clerical staff, and both would be provided. In the interim further calls on the ingenuity of the staff to improvise accommodation could be expected. An appointments system for outpatients would also be introduced at the earliest possible moment. Hospital medical committees, as well as nursing and domestic staff committees, were a matter for the immediate future: both he and the council were anxious to do everything possible to foster the individuality of every single hospital, subject only to the overriding necessity and the still greater goal of a hospital *service* for London and the Londoner. There were legal as well as moral obligations which inevitably entailed some centralisation; but within the limits thus set each hospital should develop a personality and a life of its own. There was no surer way of achieving this than by the active interest of staffs of every grade in "their" hospital.

Another of his ambitions was to see consultants in charge of beds, fully responsible for the treatment of patients and actively interested, under the leadership of the medical superintendent, in the smooth running and wellbeing of the whole hospital, not just of their own section. The whole must always be greater than the part.

NEED FOR BLOOD-DONORS

IN some parts of the country the hospitals' need for blood for transfusion is now exceeding the supply and stocks in the blood banks are dangerously low. At least 200,000 new donors are needed altogether. The number of donors has fallen alarmingly since the end of the war. In one area the panel has dropped from 48,000 members to 12,000; in another from 3000 to 640. Many donors who have returned home, either from the Forces or from war work, have not re-enrolled in their own area.

The Ministry of Health suggests that the main cause of the drop in donors is the false impression that transfusions are needed only in time of war. In fact, during the last six years, the impetus given by the war to medicine generally has led to a greatly extended knowledge of transfusion and a wide expansion of its use. Thus one hospital which formerly used 80 pints of blood a year now uses 30–50 pints every week. Transfusions are now used for the treatment of accidents, hæmorrhage, burns, and a variety of diseases associated with blood loss, blood destruction, or failure of blood formation. In particular, blood-transfusion is one of the chief factors in the greatly lowered maternal and infant mortality-rates. Recently, after an explosion in the North of England, all the blood in the local bank was used, as well as that in the two nearest civilian hospitals. Owing to the poor attendance during the previous weeks at blood-donor sessions in this area, it was not possible to replace the stores at these three banks from the central reserve, and odd bottles of blood had to be collected from all over the region. With sufficient donors on the panels, an individual donor will not be called on to attend a session more than once or twice a year, and time spent at a session does not normally exceed half an hour.

The following reports illustrate present needs:

London.—The Luton depot is "desperately short" of donors: 10,000 more are needed. The Slough depot wants another 15,000 donors. At Sutton, 50,000 donors are needed to keep a workable panel; but of the 50,000 war-time donors who have been circularised only a sixth have replied that they are willing to continue. From this depot regular deliveries of blood to hospitals have had to be cut and only the very minimum amount supplied.

South-west Region.—15,000 to 20,000 new donors are needed.

Oxford.—2000 new donors are needed to supply civilian demands which are increasing. The depot serves a very large area.

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Cambridge.—About 8000 more donors of all blood-groups are needed for the Eastern Region.

Liverpool.—10,000 new donors are required to maintain the panel at a working level; if it remains below this figure critical demands may not be met.

Manchester.—30,000 new recruits are needed. At Christmas supplies were nearly exhausted and 50 volunteers just meet the critical need.

Sheffield.—The panel at the peak war-time period numbered 100,000; now it is 30,000. At least 30,000 more donors are needed to meet commitments in the North Midlands.

Newcastle-on-Tyne.—20,000 new recruits are needed. During the last few weeks of 1945 the blood contributions were 30% short of the need for the 25 banks in the region.

Wales.—The Blood-transfusion Service needs 10,000 recruits for immediate needs during the next three or four months.

The Ministry of Health is making a special appeal to those who have been on donor panels to continue their support wherever they are. Those not already enrolled in the Blood-transfusion Service are asked to enrol now at the local blood-transfusion depot or when a local appeal is made for new donors.

SHORT-SERVICE COMMISSIONS FOR SPECIALISTS

A CALL FOR VOLUNTEERS

THE Central Medical War Committee has been informed that, on the recommendation of the Medical Personnel (Priority) Committee, it has been decided that specialists and graded specialists recruited to the medical branches of the Forces will now be accepted for short-term employment for eighteen months if they were born before July 1, 1915. The commissions held will be known as "specialist short-service emergency commissions." They will be granted to those specialists and graded specialists (born before the above date) who are called up under the compulsory recruitment procedure and to those above military age (born before July 1, 1905) who offer their services voluntarily.

The Central Medical War Committee is instructed to carry out specialist recruitment to the extent necessary for the replacement of serving specialists who are due for release in class A or recommended for release in class B and who cannot be released unless substitutes are provided. The committee has been making every effort to increase the yield of specialist recruits, but only with limited success; and already there are a considerable number of Service specialists whose release in class A is being retarded. The committee therefore appeals for offers of voluntary service and hopes that specialists above military age who might hesitate to offer their services for an indefinite period will be prepared to accept the new short-service commissions. Officers holding these commissions will be returned to the United Kingdom before the end of their 18 months' service and will be eligible for 28 days' leave on full pay on completion of their service.

Volunteers should communicate with their local medical war committees, or, in the London area, with the Committee of Reference at B.M.A. House, Tavistock Square, W.C.1. The need is urgent and it is hoped that there will be an immediate response to this appeal in order that serious hardship to the Service specialists due for release may be prevented.

The short-service commissions will not be granted to general-duty officers, but doctors will no longer be recruited compulsorily for general duty unless they were born on or after July 1, 1915. Civil direction is now applied only to male doctors below the age of 31. Women doctors are no longer liable to direction.

THE hospital built by Canadians in the grounds of Cliveden, the Thames-side estate presented by Lord Astor to the National Trust, is to be presented to the trust as the Canadian war memorial in Britain. The hospital, which contains 600 beds and cost over half a million pounds, is to be administered by the Nuffield Hospital Trust, and will eventually become primarily a specialist centre for research into rheumatic heart disease in children; but for some years a general section will be retained to relieve the shortage of beds in the area.

Reconstruction

THE INSURANCE BILL

EFFECTS AND IMPLICATIONS

THE Beveridge report, which appeared in November, 1942, proposed to "abolish want" by ensuring that anyone unable to earn a living should be able to draw allowances sufficient for subsistence. There was to be a national minimum standard of living.

In September, 1944, the Coalition produced a white-paper on Social Insurance which put forward a rather less comprehensive instalment of "social security." Now, a little more than three years after Sir William Beveridge astonished the country with his great plan, the Labour Government has presented Parliament with a Bill which goes further than the Coalition white-paper and if all goes well should in fact fulfil the object of guaranteeing freedom from physical want. Payment is proposed at the following rates:

Sickness and unemployment: 26*s.*, with 16*s.* for a dependant and 7*s.* 6*d.* for the first child.
Retirement pensions: 26*s.*
Widows and orphans: Widow's allowance, 36*s.*; widowed mother's allowance, 33*s.* 6*d.*; widow's pension, 26*s.*; guardian's allowance, 12*s.*
Maternity allowance: 36*s.*; attendance allowance, 20*s.*
Maternity grant: £4.
Death grant for adults: £20.

Some of these rates are rather higher than those recommended in the Beveridge report, and this should compensate for the rise in the cost of living during the past three years. For this reason, and because it is more complete, the scheme as a whole is more expensive than that of the Coalition; but the additional cost is to be mainly met by higher contributions. The amounts payable (including contributions for the National Health Service but not under the industrial injuries insurance scheme) will be:

—	Employed person	Employer of employed person	Self-employed person	Non-employed person
	s. *d.*	*s.* *d.*	*s.* *d.*	*s.* *d.*
Men over 18 ..	4 7	3 10	5 9	4 8
Women over 18 ..	3 7	3 0	4 10	3 8
Boys under 18 ..	2 8	2 3	3 4	2 9
Girls under 18 ..	2 2	1 9	2 11	2 3

These payments, though substantial, will by no means cover the entire cost of the benefits, which is estimated at £452 million in 1949, rising to £496 million in 1955. In these two years something like £118 million and £143 million will have to be found by the Exchequer, which will also have to pay for family allowances. The *Manchester Guardian* (Jan. 25) points out that a high flat-rate for contributions, bearing hardly on those with small incomes, "is the price we must pay for our insistence on maintaining the fiction that our social security system is run on an insurance basis."

"In fact, of course, social security is a synthesis of insurance and public relief, different in character from each but serving the purposes of both. Insurance is essentially the pooling by voluntary contract of specific and calculable risks, with premiums actuarially related to risks and benefits to premiums. Social insurance, the compulsory pooling of common risks among a more or less homogeneous group, is merely an intermediate phase in the evolution of social security."

It adds, however, that the flat-rate has the advantage of bringing home to all of us that "security can be a costly privilege unless it acts as a spur to effort and enterprise, and that its cost can be reduced in proportion as we accept the obligation to minimise our calls upon it as far as lies within our power."

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SICKNESS AND UNEMPLOYMENT

When the Coalition white-paper came out we urged the Government to give further thought to the possible unification of sickness and unemployment benefit (1944, ii, 475). We hoped "that the day had passed when administrators viewed statistics on their office desks as if the difference between incapacity and capacity was always the difference between black and white—rather than different shades of grey." We criticised the white-paper view that "sickness benefit of unlimited duration would be psychologically unwise," and we are therefore glad to see that the new Bill allows the appropriate rate to continue unaltered throughout incapacity, however long.

For unemployment benefit it has been thought necessary still to retain a maximum period, and this is described as 180 days in a particular spell of unemployment. There are extra days for a good contribution record, and the Minister is given power to make regulations permitting a local tribunal to make further extensions, to be paid for by the Exchequer rather than the National Insurance Fund. The wisdom or otherwise of paying unemployment benefit for an unlimited period raises social issues into which we need not enter; but we venture to repeat a previous caveat: "In an age when the demand for purely medical work will be greater than ever before it will be a loss to the community, as well as an embarrassment to the profession, if more instead of less attention has to be devoted to certification problems." The benefits are all to come from a single fund, and it is greatly to be hoped that for the mere statistical process of labelling a man "sick" or "unemployed" there will not be too large an army of referees pronouncing second opinions on the capacity of workers for jobs which do not exist. In other words, the administration of the scheme in the local offices of the Ministry of National Insurance should be so completely coördinated that there is no risk of an official in charge of sickness benefit becoming over-zealous to reduce the claims on his register, when the sole result of the activities of himself and the medical referee is to push the claimant over the wall into an adjoining room where his benefit will begin to clock up against him towards the maximum of 180 days' unemployment. The probable reluctance of any Government of the modern type to force a genuinely unemployed man over to the means test, even after the 180 days, only makes stronger the argument for complete unification.

The only true sanction for benefit in the last resort is the offer of work that a man can reasonably perform. If ultimately it is found feasible to remove the limit of duration of unemployment benefit, then the way will be clear for treating and judging each claiming patient in the light of his own particular circumstances (instead of against some arbitrary test). The unified benefit could then be paid, as we suggested, if "the applicant has not, without just cause, failed to continue or to take up work for which he is medically suitable."

The Bill recognises, for the first time, that a sick person has certain minimum needs which should be met without requiring him either immediately or at the end of six months to draw upon his savings, his relations, or public assistance. While the sum of 26*s*. per week is not extravagant, it is not, on the other hand, deliberately and substantially below the barest cost of subsistence—as has been the case with sickness benefit hitherto. The prudent and independent citizen will still feel obliged to make some provision for himself on a voluntary basis beyond the bare allowance offered by the State. As Sir William Beveridge put it, "the State in organising security should not stifle incentive, opportunity, responsibility; in establishing a national minimum, it should leave room and encouragement for voluntary action by each individual to provide more than that minimum for himself and his family."

FURTHER OUTLOOK

A novel and welcome provision in the Bill is that every five years "the Minister shall review the rates and amounts of benefit in relation to the circumstances at the time of insured persons in Great Britain, including in particular the expenditure which is necessary for the preservation of health and working capacity." If he finds the circumstances have changed since the rates were last laid down, he will be expected to draw attention to the facts.

If there is a noticeable rise in the cost of living, public opinion will no doubt lead or force the Minister of the day to promote legislation for upward adjustment of the benefit. If there should be a fall in the cost of living. . . . But there is perhaps no need to pursue this discussion, in view of what economists say about the improbability of a downward trend.

The probability of a general increase in sickness claims was discussed in these columns a year ago, when reasons were given for anticipating a high level of claims (1945, i, 156). The Government Actuary now says:

> "While it is true that, as a result of the comprehensive health and rehabilitation service which is to be provided in place of the more limited existing medical benefit, a substantial improvement in the health of the community should be secured in due course, this may well be accompanied by a change of attitude towards absence from work on account of sickness, and it does not necessarily follow that the cost of sickness benefit will be correspondingly abated." (Cmd. 6730, p. 24.)

Consequently, apart from the adjustments required for changed conditions, he has loaded his calculations by 20% for men and 25% for women. This realistic attitude is to be commended.

The means test will, of course, remain for supplementing benefit where required, but the number of cases needing this aid will be very much smaller. The Coalition white-paper said that "when the new Insurance Scheme is in operation" there would be arrangements for National Assistance in every type of case. Thus would be accomplished the final break-up of the old poor-law. The new Bill and its explanatory memorandum are silent on this subject (except that the former makes a small adjustment in respect of older persons), so the final transfer from the local authorities must be awaited.

The substantial point is that towards the ideal of "social security" set forth in the fifth clause of the Atlantic Charter there is now to be written into our statute-book a degree of material security—modest, yet not unreasonable—for that group of the community with whom doctors have most to deal.

Life is more than material things, but inadequacy of material things spells, for most of us, inadequacy of life. If this great scheme is administered with humanity and fits into its right place in the nation's life, it will surely be acclaimed a great advance. By now, however, we should all be fully aware that the resources of the community, though they can be redistributed by legislation, can no longer be much increased without work. As the *Times* remarks (Jan. 25), the new Bill means that a higher proportion of the national product is to be set aside for the old, the sick, the injured, and the unemployable. "If the standard of living of those able to work is not to suffer in order to enhance the well-being of those unable to work, the Labour plan for social security requires more from the nation, and especially from the workers, of effort and sacrifice to enlarge the total national income available for distribution."

THE inaugural dinner of the Mid-Bucks Medical Society was held at the Bull's Head, Aylesbury, when Sir Heneage Ogilvie, the president, gave an address on the purposes of medical societies. The society's chairman is Dr. J. M. Craig of High Wycombe, and the treasurer and secretary is Mr. W. D. Lovelock-Jones of Amersham.

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In England Now

A Running Commentary by Peripatetic Correspondents

WE wonder, in this establishment, whether we too have outstripped evolution with your correspondent who wrote so feelingly about demobilisation. Like him, we rely on the intelligence of our amateur S.B.A. typist to correct our mental lapses. We did have a professional Wren stenographer, but she had to go. Her blonde girlish charm overwhelmed the younger members of the staff, while her inability to spell such simple terms as polyfollicular hyperkeratosis disorganised the routine. She in her turn was somewhat shattered by the fluent way our staff directs a mixed bag of demobs. ("joining and leaving"), not to mention the daily halt and lame—"I want you 'ere at 0830 tomorrow morning, and if you're adrift you won't see the —— M.O.," or "Get in there, and strip off Harry Nuders."

Still, we have our fun. It isn't every day that one meets a sailor dogged throughout his career by "halifax rigidus." My oppo, bemused with M51s, wondered whether this was a rare Newfoundland disease, contracted during the dark days of Atlantic convoys, until his olfactory nerves directed his attention downward, where more than a stiff toe was clamouring for treatment.

I have had the pleasure of examining the jockey, ex-air-fitter, who rode in France for a well-known oriental potentate before the war. Surely, a far cry from the plaudits of the crowd at Auteuil or Chantilly to the deck of a carrier and the exhortations of Commander Flying. Then there was the leading airman who hoped his heart was in good condition. Switzerland and winter sports were calling. ("As a matter of fact, Sir, I was born with rather a silver spoon in my mouth.") One of my demobees actually offered me a job. He will be going to Finland to pick up the threads as a big business executive, and wants keen young men to help him, preferably with a university degree. Our resettlement officer almost got the job, but like me he didn't have the Finnish, or the Norwegian, Swedish, or Danish, without which, out there, the execution of big business is apparently impossible.

Yes. Demobilisation is a great game. But who is going to examine me? One is reminded of that mythical bird which flew in ever-decreasing circles until &c., &c. Still we do claim to be one Naval establishment which is not over-doctored. For the first time in my Service career I'm doing a full day's work, and sometimes, let it be whispered, lest surgeon commanders of old turn in their graves, even on Sundays. Oh yes. We are very busy. Our statistical department has worked out, on the latest Neurathian principles, that if the 17,000 men who were short-armed during the past six months were lined up end to end, well—it would be a fine body of men. * * *

Whether we approve or not, children go to films and will continue to do so. The problem is therefore not whether they are right to see films but what films they are to see.

Some years ago a kindly local authority gave a Christmas party to all the school-children who had been patients at its clinic; most of them were pretty tough and hearty. The treat consisted of a tea, presents off the Tree, and "pictures"! Those were the lean years with families, many of them living off the dole, and it always surprised us how few children made a good tea. Now we know more from evacuation, and can imagine that the white cloths, bright china, and profusion of implements may have had an intimidating effect. No paper for the chips, so to speak. The presents were often received with a frank criticism which amused, and rather scandalised, the good sisters who had slaved a whole day to bestow them fairly. "Miss, I'd rather 'ave paints, my bruvver got one of these." No nonsense about saying thank you first. But the pictures were always received with rapture. They were shown on a bed-sheet with a few ripples marring its surface; no colour of course, and no sound, hand-turned, and the ancient strips loaned by the companies always broke several times. Waiting in the dark produced no whimper of complaint, and the stories were the most primitive pseudo Walt Disney, or comedy of the beer-bottle and custard-pie variety. The applause was always terrific and quite undiscriminating. Even in those days we duly read the writing on the wall; and now children's film performances have come to stay.

On Jan. 5 a special correspondent of the *Times* discussed the whole matter from what seems a rather highbrow standpoint. He objects to the vulgarity and triviality of much that is shown; but, as our audiences showed us years ago, children are not very critical when they are enjoying themselves. He is on surer ground in objecting to the slogan of one well-known film company with its "anthem" indicating that 300,000 people who think (save the mark) alike can't be wrong. As we have just spent six bitter years fighting to the death to prove our profound conviction that 70 millions were thinking alike and wrongly, one can't help thinking that Odeon might do worse than begin their season with a competition for a new song. But the film business was born with no illusions about commercial values, and it is probably true that the Saturday morning children's clubs will remain mainly local in their appeal. By that I mean that a particularly interesting film at the XYZ Theatre in the neighbouring borough will not attract children away from a show at the picture-house which they are accustomed to attend. Their mothers like to know where they are, and the main purpose of the Saturday film is to find a safe occupation for the largest slice of unsupervised time in the school-child's week. Here again, the *Times* correspondent seemed to lack understanding. Children of his own class, who went with him on his tour of exploration, became bored with the entertainment offered. And he sympathised. But does he realise that among the elementary-school population as a whole there are still only a small proportion of children who have any idea of or any training in the proper use of their hands? There are an increasing number of classes in handicrafts and in the practice of the arts but far too few. The time for it, the materials, the place and room and staff are all lacking. And how many working-class homes have the room for a playroom or junk shed for the children? Let us be realistic about the facts that lie behind this hunger for easy entertainment.

But the urban child is not lacking in interests, and there is no doubt that the cinema could be a most powerful force in educating these interests, and in cultivating good taste. Films about people and their jobs, films about how railways work and where the gas comes from, about local government, and children at school in other countries; films made by children and films about children—hundreds of subjects suggest themselves. Children film-goers will continue to crave for excitement and the serials, for passions and drama, which is the very stuff of childhood. It will be our fault if they are given the trivial and empty-minded pap which they are ready to receive, unless they get to know something better.

* * *

The other day one of us was approached in the mess by an officer who diffidently asked him for advice. "It's like this, Doc," he explained, "my missis has just had an operation for dropping of the womb, and the surgeon has sewn her up rather too well, if you see what I mean, and it makes things—er—rather awkward—in fact, absolutely impossible. We are both very anxious to have another child, so I wondered if anything could be done about it. . . ." My friend explained that he was no authority on such matters and that the officer had better see the gynæcologist. "He comes next Tuesday, why don't you pop up to the hospital and have a chat with him?" The following Tuesday the officer asked at the hospital for the gynæcologist. A kindly corporal thought he could not want the gynæcologist, he must mean the psychiatrist, and the officer was duly ushered in. Half an hour later he left the room with a sealed envelope. Inside was the familiar form on which was written: *This officer is suffering from an acute anxiety state and should be regarded as "Fit for Home Service only."*

* * *

Those who have suffered from a surfeit of the Army may appreciate the story of the water closet which went out of order in the seaside hotel. The cistern refused to fill, and a bucket of water was left so that users could flush the pan themselves. One day a colonel (? from Hyde Park Gate) was found inside with a broken leg. He had fallen when climbing up to pour the water into the cistern, so that he could pull the chain and the water would come down through the "proper channels."

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Parliament

ON THE FLOOR OF THE HOUSE

MEDICUS, M.P.

FOR Parliament the first week since the recess has been one of preparation, but during the preparation for bigger things to come some measures of importance have been passed The Bill for controlling furnished lettings of rooms, flats, or houses, for instance, will be a help in the acute housing shortage. The Minister of Health got that through without serious opposition. Indeed, Mr. Bevan is doing well. His meetings with the representatives of local-government authorities, with the Negotiating Committee of the medical profession, and with others are going not too badly. The big debate this week, on civil aviation, was rather dull, no doubt importantly dull, but certainly not sparkling.

And a great deal of the limelight had been focused not on the Parliament at Westminster at all but on the meetings of the United Nations in Westminster Hall. It was there that Mr. Bevin, as delegate of Great Britain, made his announcement that certain mandated territories in Africa would be placed under the new trusteeship system of UNO. There has been no protest in the House of Commons against this announcement being made first to the world international organisation—a big change and a significant one.

Answers to questions in the House show that the design of the fighting Services in the future is being considered in detail. It is hoped that this will include a limited and definite period of service for newly recruited R.A.M.C. officers. It is hoped to solve the question of medical specialists in the Navy, Army, and Air Force by the offer of short-service commissions.

The National Insurance Bill is a big measure and there will be a good deal said on its medical aspects in the House at a later period. Behind the scenes there is active discussion on parliamentary machinery, for Parliament is still, in some of its aspects, a 19th-century institution. But with the spate of legislation now to be tackled new procedures are necessary. And Parliament is grappling with the question of how to deal with a large output of legislation, much of it pressing, through its "standing committees" and not on the floor of the House, and yet retain real democratic control. But Parliament is a living organism and it will grow out of its 19th-century shell into its 20th-century form.

QUESTION TIME

National Health Service

Sir HENRY MORRIS-JONES asked the Minister of Health whether he had yet started consultations with the representatives of the voluntary hospitals and the medical profession, on the national health proposals; and whether the result of the discussions would be made public.—Mr. A. BEVAN replied: I am engaged in discussions with representatives of the medical profession, local authorities, voluntary hospitals, and others, to obtain their expert advice on my proposals for the National Health Service. My proposals will be published in the usual manner by the introduction of draft legislation for the approval of Parliament.

Major HUGH FRASER asked the Minister if he would make a more precise statement on the future administration of British hospitals. Mr. W. MCADAM asked what were his proposals in respect to the present hospital services.—Mr. BEVAN replied: I would ask members to await the presentation to Parliament of the Government's proposals.

Industrial Diseases among Miners

Mr. PETER FREEMAN asked the Minister of Fuel and Power if he would have a special inquiry made into the question of stone-dusting and coal-dust problems in connexion with coal-cutting and conveying machines underground, with reference to the effects of both kinds of dust upon miners' lungs and as contributory causes of the lung diseases that were painful and prevalent in some coalfields, with a view to their reduction.—Mr. E. SHINWELL replied: Measures to reduce dust in coal-mines are already the subject of investigation and action by the industry and by the inspectors of mines, and though I am satisfied that much progress is being made, particularly in South Wales, this will have to be accelerated. In addition a joint committee, composed of representatives of my department and the Medical Research Council, is assisting a research unit in South Wales dealing with the cause, treatment, and prevention of pneumoconiosis.

Specialists in the R.A.F.

Sir E. GRAHAM-LITTLE asked the Under-Secretary of State for Air to what extent the medical branch of the R.A.F. recognised the grade and title of specialist; when did this recognition first take place and whether specialist pay followed upon this recognition; how many specialists had been taken into the medical branch of the R.A.F. since VJ-day; were they being employed in their respective specialties; and what arrangements as regards inclusion in age-plus-service groups operated for demobilisation of specialists.—Mr. JOHN STRACHEY replied: In the medical branch of the R.A.F. specialists are recognised as such when they have acquired a higher medical qualification in their specialty and have been recognised as competent by the consultant concerned. Specialists have been employed since the formation of the Royal Air Force in 1918 although the general use of the title grew up only during the recent war. It is now used when officers so qualified are appointed to established posts for specialists. Specialist pay does not follow recognition as a specialist in the R.A.F., but specialists normally receive higher rank than non-specialist medical officers. This accords with the recommendation of the report made in 1933 by the Committee on the Medical Branches of the Defence Services (Cmd. 4394, para. 97). Two specialists (one oto-rhino-laryngologist and one anæsthetist), who are each employed in their respective specialty, have been appointed to the R.A.F. medical branch since VJ-day. They are both replacing specialists released in class B. Specialists have been demobilised in their age-and-service groups up to Dec. 31, 1945, but since then no doctors have been allotted to the Royal Air Force and we have had to retain 7 specialist officers who are occupying established specialist posts until the Central Medical War Committee can provide replacements. One of them is already being relieved and will now be demobilised.

Unrra and Help for Austria

Mr. P. FREEMAN asked the Secretary of State for Foreign Affairs whether a programme of help from UNRRA had now been arranged for Austria; and whether he would state the amount allocated for such purposes and give any information he had concerning present conditions in Austria.—Mr. E. BEVIN replied: The Allied Council in Austria has formally requested UNRRA to assume responsibility for the import of relief and rehabilitation supplies into Austria. I understand that UNRRA is prepared to undertake this responsibility as from March 1, but is also trying to get certain supplies to Austria before then. A date some time ahead has to be fixed for a change-over of responsibility of this kind if it is to be achieved without dislocation. Discussion as to the amount to be allocated to Austria by UNRRA is now going on in Washington. The resources of UNRRA are limited and a number of countries are dependent upon them, and allocation involves a difficult task.

Mr. FREEMAN: Is the Minister aware that recent reports from Austria state that out of 70 deaths, 65 are due to starvation; and could he bring pressure to bear on UNRRA to expedite their activities to prevent further deaths in the country?—Mr. BEVIN: I recognise that conditions in Austria are very bad. There are two things necessary in Austria—the speeding up of UNRRA distribution and in addition I have been pressing for a considerable time for a withdrawal of the large number of troops in that area.

Quality of British Penicillin

Sir H. MORRIS-JONES asked the Minister of Health whether he was aware that recent supplies of penicillin made by English manufacturers had been found unsatisfactory and inferior to the U.S.A. product; and whether he would investigate the matter.—Mr. BEVAN replied: I understand that there have been complaints about the relative insolubility of some samples of British penicillin but there have also been complaints about some American penicillin. Supplies of British penicillin have now greatly improved in quality and in some cases are being asked for in preference to American.

As part of a scheme for the restoration of medical libraries in Europe ASLIB have agreed to the transfer of their microfilm service to medical uses, and by arrangement with the Royal Society of Medicine the service on Jan. 1 became an integral part of the Central Medical Library Bureau at 1, Wimpole Street, London, W.1.

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Letters to the Editor

DESIGN OF RAILWAY CARRIAGES

SIR,—Your peripatetic correspondent is to be congratulated on his brilliant (and euphoric, if not febrile) exposition of a question of major importance to the public health, in your issue of Jan. 19. His appeal for a railway carriage conforming to modern standards of hygiene comes at an opportune moment, when the railway companies must be considering the provision of enormous quantities of new rolling stock to replace what has been worn out during the war. It would be interesting to know their views on the subject of your article; but surely this is not a question which should be left to the discretion of the railway companies. Whatever we may think about nationalisation, this is a matter which should, I suggest, be considered by an independent committee of experts so that a national policy can be laid down. There are so many obstacles in the way of any radical alteration of design that one cannot feel optimistic about relying on the initiative of the railway companies.

Two additional points may be mentioned. The present clumsy, antiquated type of carriage door is retained for reasons of safety (although a door opened while the train is still moving is obviously a danger in itself); but the one-compartment coach with a door at each end should enable sliding doors to be introduced, fitted perhaps with an automatic locking device coming into action when the coach is moving. The other point is the impossibility of adequate under-seat cleaning in the present design.

Cropston, Leicestershire. A. W. S. THOMPSON.

SIR,—Your peripatetic correspondent (Jan. 19) has raised a subject which has long needed ventilation (*mot juste*) in medical circles. Railway carriages in this country have retained the form designed, and perhaps adequate, for a community which did not, 80 years ago, travel so regularly by train as we do at present, and whose ideas of ventilation were conditioned by an unfounded fear of fresh air. The point need not be laboured. Your correspondent has brought out the facts, too often ignored, that matters of this kind are susceptible of experiment, and that to ask the public, who for the most part have not experienced an alternative kind of railway car, for an opinion as to the relative merits of different forms is no more helpful than to ask the modern child whether he prefers apples or bananas, not having tasted the latter.

It is a proper function of medicine to insist with some force that any undertaking, public or private, which in any way affects the health of the people must receive consideration from that point of view, and that the health consideration must not, as so often before, be made subsidiary to considerations of profit or expediency. Public transport is obviously a service which closely affects public health. The railways will probably in future be controlled by the State, and the present time seems opportune for experiment by competent experts to design railway cars of all kinds, but more especially for crowded local services, which may best provide reasonably healthy and comfortable accommodation. There is evidence that experiment is constantly carried out in relation to bus and underground services in London, but suburban railways remain very much as they were.

Bureau of Hygiene and Tropical Diseases, Keppel Street, London, W.C.1. CHARLES WILCOCKS.

AT LEAST FIVE THOUSAND

SIR,—I can fully endorse the views of "Surgeon Lieut.-Commander" on release of doctors from the Navy (Jan. 26, p. 143). Conditions are even worse than his letter implies; a specialist whose demobilisation has been deferred can get no estimated date of release, and is simply informed by the Medical Department that he cannot yet be demobilised "as no relief is available." This uncertainty results in particular hardship for those who wish to take up civilian appointments, and also for those who want to take definite steps towards finding a home. STILL-SERVING M.O.

*** An account of new arrangements for the recruitment of specialists appears on p. 175.—ED. L.

MORE BEDS OR BETTER OUTPATIENT DEPARTMENTS?

SIR,—Like Dr. Nelson-Jones, I found great interest in Dr. W. A. Lister's ideas. But I was especially interested that Dr. Nelson-Jones's methods for working his R.A.F. medical outpatient clinics correspond in exact detail with those which I worked out quite independently for the running of the outpatient clinics of my own R.A.F. medical division. Without such a system it would have been impossible to have got through the volume of war-time work which presented itself. Although I agree with every word of Dr. Nelson-Jones's conclusions, there are two points in his admirable letter which I feel should receive rather more stress.

It is, I think, too little appreciated in high quarters that by keeping non-acute cases out of hospital one not only supports morale but also saves the country a very appreciable sum of money; for any airman (and this applies even more to officers) admitted to the ward is lucky if he gets out of hospital within a fortnight. The reason for this is not the complications of his investigations or treatment but the overwhelming amount of paper procedure necessary prior to his discharge. And this leads on to Dr. Nelson-Jones's main contention, with which I am very strongly in agreement—adequate secretarial help is essential.

The only real difference between ordinary hospital practice and Service medicine (as it affects Service hospitals) is the greater amount of paper work involved in the latter. Unfortunately some of us, war-time medical specialists, found ourselves trying to make an efficient department out of a peace-time set-up which gave no establishment at all for secretarial help, so that we were pressed, so to speak, clerically from two sides. At such times when I was unable to misemploy a nursing orderly (or a redundant radar operator) as my secretary I frequently found myself spending a great deal of my time copying my own opinion from one sort of form onto another (differently set out) sort of form—many times, too. I cannot believe that the Service departments—or for that matter the Treasury—ever intended that highly qualified (and paid) medical personnel should be employed in such a manner.

One of the major perils of the socialised medicine which is shortly to be forced on us will be FORMS. These are the curse of Service medicine and are likely to be a major curse of that branch of the Civil Service to be known as the National Health Service. It cannot be too much stressed that an ability to fill in forms correctly does not make a good doctor. Let those responsible for this National Health Service keep well in mind that a doctor is not a specialised clerk adept in the jargon of his trade, and preserve him, in some measure at least, from strangling red tape and the epitaph:

"This was a doctor. Down let him sink,
Throttled with paper and drowned in ink!"

Blechingley. DOUGLAS ROBERTSON.

WAR PENSIONS

SIR,—As the majority of war pension cases that go before the appeal tribunals in Britain are fought by the British Legion, I feel that I cannot allow to pass without comment the remarks made by one of your Peripatetic Correspondents on Jan. 19 (p. 104).

With regard to hygiene in the Services being immeasurably better than in civilian life, I would say that this is the exception rather than the rule, and it is not true that in military service welfare is a source of perpetual solicitude. I wonder whether your correspondent saw the recent film *Burma Victory*? The conditions there appeared to be far from hygienic and welfare was non-existent: this type of campaign made such things impossible. The same applies, though sometimes in lesser degree, to other campaigns and even in some instances to troops stationed in this country, especially during the earlier days of the war. Likewise to suppose the Service-man has unlimited access to treatment is looking at things through rose-coloured spectacles. It is remarkable how often one of the chief complaints is that "the medical officer did not give me any treatment at first, just medicine and duty. Then when I really got bad he sent me to hospital."

In pension cases where the disease is of unknown ætiology, the lawyer—or, as is usual, the Legion—

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demands a categorical answer because the royal warrant for pensions (Cmd. 6489) states that the appellant is *entitled* to a pension unless the Ministry can prove beyond any reasonable doubt that the disability was not attributable to or aggravated by war service. Who framed this warrant? The Government. Are we to be blamed for making sure that its terms are carried out? I am sure that most doctors will agree that the fact that the incidence of any disease is no greater in the Services than in civil life does not prove beyond any reasonable doubt that that disease in a particular case was not caused by some factor in military service. It is useless trying to generalise in these cases: each must be treated on its merits and general statements of medical opinion as to *theories* about the causation of a particular disease should not be decisive. I regret to say that at the present it is the practice of the Ministry of Pensions to rely mainly on this type of statement in rejecting claims, and often pensions appeal tribunals uphold them.

With Dr. Piney (p. 108) I would ask how, if the cause of a disease is unknown, can anyone give an expert opinion on its relationship to military service? I also agree with Dr. Piney that one is far more likely to get a fair decision from a judge than from the medical services division of the Ministry of Pensions or an expert speaking ex cathedra. Here I would refer your readers to the recent case of Taylor *v.* the Minister of Pensions in the Court of Session, in which the Ministry of Pensions had stated that as "asthma is an allergic condition based on hypersensitivity to certain substances," it could not be held attributable to war service. The pensions appeal tribunal—its legal member dissenting—supported the Ministry, but the Lord Justice Clerk reversed its decision; as the girl had never suffered from asthma before joining the Service, he held that she was entitled to her pension under the terms of the royal warrant and that the general statement of medical opinion put forward by the Ministry was not sufficient evidence to discharge the onus of proof which rests upon them.

In conclusion, may I ask your readers not to blame the lawyer or the Legion for asking them to prove a negative. The terms of the royal warrant are laid down in black and white, and we just intend to see that they are carried out and that the benefit of any doubts go to the men or women who have served their country.

May I also take the opportunity of asking your correspondent one categorical question: Can he tell us the real cause of peptic ulcer? No *theory*, please; just a plain Yes or No.

J. H. WOOD,
Secretary, Pensions Department.
British Legion (Scotland), 30 St. Andrew Square, Edinburgh, 2.

INFUSION INTO THE INTERNAL SAPHENOUS VEIN

SIR,—Mr Kirkham in his article on infusion into the internal saphenous vein (Dec. 22) suggests that cutting-down is the most satisfactory method where transfusion is to be continued 24 hours or more. I agree with Miss Louden's view (Jan. 12) that, wherever practicable, the intravenous approach should be employed; with proper attention there is no difficulty in maintaining drips by this means for 3, 4, or 5 days. In my experience the best instrument for this purpose is the "West Middlesex" type of incorporated sharp hollow trocar-needle and blunt cannula (supplied by Hawkins & Co., Ltd., 15, New Cavendish Street, London, W.1); and the most convenient site is the stem of the inverted Y formed by the radial (cephalic) vein where it winds round the radial border of the forearm about 2 in. above the lower end of the radius.

Memorial Hospital, Woolwich, S.E.18. H. J. ROSS.

SIR,—Mr. Kirkham's article of Dec. 22 raises one of the most important problems in minor surgery. Miss Louden rightly suggests (Jan. 12) that veins should be treated with respect; indeed none should be sacrificed except as a last resort. In this connexion I recall a patient whose gut had been resected with end-to-end anastomosis for late pelvic volvulus; he could not be fed orally owing to peritonitis, and received continuous intravenous fluid for ten days; without the veins at our disposal recovery would not have been possible.

A Guest cannula with an inner needle is, in my experience, the instrument of choice for avoiding venous strangulation. Though well designed, it is not always easy to use since friction between the cannula and the skin often causes venous collapse or distortion. Moreover, even with the needle in the vein, it is sometimes difficult to complete the insertion of the cannula; and if part of the cannula lies in the venous wall, mural laceration is inevitable.

These difficulties can be overcome by fully distending the vein and cutting-down under procaine anæsthesia; with the help of dissecting forceps, the assembled cannula is inserted under direct vision, after which the needle is withdrawn, the cannula pushed farther in, and the skin sutured.

By this means ligation of the vein is avoided. Thrombosis takes place after two days or so, but the vessel's patency is eventually restored by recanalisation.

Hunts Cross, Liverpool. S. MUNTARBHORN.

EFFECT OF LARGE DOSES OF ALKALI ON KIDNEY FUNCTION

SIR,—The conclusion arrived at by the Army Malaria Research Unit in their paper of Dec. 1 is very far-reaching, and since it is based on observations made on only three subjects a statistical analysis of the figures presented is surely required before it is possible to determine what value, if any, should be placed on the results quoted.

The authors are clearly concerned only with the effects of excessive doses of alkaline sodium salts, and not, as the title of the paper would imply, with large doses of any alkali, since potassium and other alkaline salts are not considered. That there is sometimes an increase in the blood-urea, and some deterioration in renal function, after the ingestion of excessive doses of various alkaline salts has been known for many years, certainly since the introduction of the Sippy diet and its modifications for the treatment of peptic ulcers.

The only unequivocal evidence of impairment of renal function that the authors actually adduce is an increase in the blood-urea and a decrease in the urea clearance in subject 2; for the slight fall in the urea clearance (unaccompanied by an increase in the blood-urea) in subject 1 is within the limits of error of any method of computing urea clearances, and would not be accepted as evidence of impairment of renal function by any experienced clinician without confirmation. It is also interesting to note that in subject 1 the blood-urea was higher, and the inulin and diodone clearances were below average, before the administration of alkaline salts. It might reasonably be argued that this subject was not normal before the experiment began.

There are many other points in the paper which are not clear to me and seem to call for criticism. For example, in control case 4, receiving sodium chloride, the percentage change in the figures during the experiment, compared with those before the experiment began, was certainly as marked as those in the three other cases, using the figures recorded before the commencement of the experiment as the controlled standard; yet, these values in subject 4 are not quoted in full and are alluded to merely as evidence in favour of the conclusions arrived at. I cannot refrain from observing, moreover, that in subject 2 the average weight before the experiment began was 144 lb. and during the experiment 146 lb.—a gain of 2 lb.—but that after the experiment the weight (one reading only) was 142 lb.—i.e., a loss of 4 lb. Yet, a rough calculation indicates a water retention of 6 *litres* (authors' figures), and the authors conclude that "the degree of water retention calculated by this rough measure is of the same order as that indicated by the changes in weight and the dilution of the body fluids." I find it difficult to believe that 6 litres of water is even roughly of the same order as 2 or 4 lb.

Again, the authors state that the total daily intake of sodium is about 900 mille-equivalents in each subject. Using the sodium concentration of the urine as given for subject 2, and the daily output of urine as shown, it would seem that the daily output of sodium during and after the experiment is well in excess of the intake, for it was 1298, 1394, 1220, and 1501 mille-equivalents for Aug. 9, 10, 11, and 12 respectively. These figures do not suggest any sodium retention—quite the reverse—nor is there evidence of any in subjects 1 and 3, although the authors say, "The figures of sodium excretion during the course of alkali therefore suggest considerable sodium retention."

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In assessing the results of an experiment of this type, would be an advantage—indeed, it is essential—to now the ages of the subjects, the nature, and particularly the protein content, of the diet, and the time n relation to meals at which the blood samples were ollected. These are not stated. Surely, too, a fluid ntake of 5 litres, or say 10 pints, per 24 hours is above he requirements of normal subjects. This alone would urely cause a profound disturbance of renal hæmoynamics in any subject.

I have read this paper with great care and much nterest, and it seems to me not only that the title is naccurate but that the conclusion arrived at is not varranted by the evidence brought forward.

County Hospital, Pembury, Kent. S. LOCKET.

INFECTION IN DAY NURSERIES

SIR,—As two of the colleagues whose criticisms are mentioned by Dr. Allen-Williams in her paper of Dec. 22, may we express our complete agreement with Dr. Kershaw's letter of Jan. 19? The supervision of the two groups of children was in no way comparable. Nursery children were under the daily scrutiny of a trained observer, whereas the "control" children were seen either at domiciliary visits or at clinics at intervals up to three months. On these occasions the chief concern was the health of the child at the time of the visit, and the health visitors received no specific instructions either to obtain or record histories of trivial past infections. It will be seen that the "control" material is inadequate for the purpose to which it has been put. We therefore wish to re-emphasise Dr. Kershaw's point that this paper must be regarded as a preliminary study. We also suggest that any future study should be confined to infections in which the diagnosis has been medically verified; the findings might then have a bearing on planning the future of day nurseries.

NORA ARCHER.
Oxford. MARY FISHER.

PROSTATECTOMY

SIR,—The many letters you have received concerning Mr. Millin's article nearly all suffer from the fault of unjust criticism. It would appear that few of the writers had attempted the method advocated.

For some years I have employed the Harris technique, and more recently, stimulated by my colleague, Mr. Wilson Hey, have paid particular attention to rigid asepsis and the control of hæmorrhage. Preliminary catheterisation is avoided whenever possible. The case with acute retention is treated as an urgency and the prostate is removed forthwith. The bladder is closed without drainage and an indwelling catheter of the Foley variety is left in the urethra for 12 days. This method, although involving very careful postoperative treatment, has given excellent results. It was therefore difficult to see that by adopting Mr. Millin's technique results could be further improved.

I have now performed his operation three times. All three patients have had an uneventful convalescence and were ready to go home within 14 days. They all passed urine on the 6th day and quickly gained control. Bleeding was negligible.

It is, of course, unwise to come to a definite conclusion yet; but my impression so far has been extremely favourable for the following reasons: (1) ease of the operation; (2) comfort of the patient; (3) control of hæmorrhage under direct vision; (4) postoperative attention considerably reduced.

There has, however, been in all cases a slight œdema of the penis. Can this be due to the cutting of the communicating vein which runs from the dorsal vein to the prostatic plexus? It would be of interest to know whether this has occurred in Mr. Millin's cases.

Otherwise my results have been so good that I shall continue to employ this method.

Manchester. R. L. NEWELL.

A Hunterian dinner will be held at the Royal College of Surgeons on Thursday, Feb. 14, at 7.15 P.M. The Prime Minister and other members of the Government intend to be present.

INFECTIOUS DISEASE IN ENGLAND AND WALES

WEEK ENDED JAN. 19

Notifications.—Infectious disease: smallpox, 1 (imported); scarlet fever, 1331; whooping-cough, 1251; diphtheria, 478; paratyphoid, 1; typhoid, 3; measles (excluding rubella), 726; pneumonia (primary or influenzal), 1310; cerebrospinal fever, 62; poliomyelitis, 6; polio-encephalitis, 0; encephalitis lethargica, 2; dysentery, 371; ophthalmia neonatorum, 51. No case of cholera or typhus was notified during the week.

The number of service and civilian sick in the Infectious Hospitals of the London County Council on Jan. 16 was 1041. During the previous week the following cases were admitted: scarlet fever, 67; diphtheria, 50; measles, 17; whooping-cough, 31.

Deaths.—In 126 great towns there were no deaths from enteric fever, 1 (0) from measles, 1 (0) from scarlet fever, 6 (1) from whooping-cough, 2 (0) from diphtheria, 61 (5) from diarrhœa and enteritis under two years, and 174 (23) from influenza. Figures in parentheses are those for London.

There were 9 deaths from diarrhœa and enteritis at Liverpool and 8 at Birmingham. Manchester reported 15 deaths from influenza, Bolton 9, no other great town more than 6.

The number of stillbirths notified during the week was 226 (corresponding to a rate of 32 per thousand total births), including 37 in London.

Medical Diary

FEB. 3 to 9

Monday, 4th

ROYAL COLLEGE OF SURGEONS, Lincoln's Inn Fields, London, W.C.2
5 P.M. Prof. F. Wood Jones, F.R.S.: Osteology. (First of six lectures.)

SOCIALIST MEDICAL ASSOCIATION
2.30 P.M. (Livingstone Hall, 66, Broadway, London, S.W.1.) Mr. Somerville Hastings: Health Centres.
7.30 P.M. Prof. J. M. Mackintosh: Social Medicine.

Tuesday, 5th

UNIVERSITY OF LONDON
5.15 P.M. (University College, Gower Street, W.C.1.) Mr. F. Bergel, PH.D.: Symptomatic Drugs—Synthetic Analgesics and Antispasmodics. (Fourth of five lectures.)

ROYAL SOCIETY OF MEDICINE, 1, Wimpole Street, W.1
5 P.M. *Orthopædics* and *Surgery*. Mr. Vaughan Hudson, Dr. J. Trueta, Mr. Clive Butler: Treatment of Acute Osteomyelitis with Penicillin.

ROYAL INSTITUTION, 21, Albemarle Street, W.1
5.15 P.M. Prof. H. Hartridge, F.R.S.: Recent Advances in the Physiology of Vision. (Second of four lectures.)

MEDICAL SOCIETY OF LONDON, 11, Chandos Street, W.1
5.30 P.M. Dr. T. Jenner Hoskin: Thyrotoxicosis. (Lectures for demobilised medical officers.)

LONDON ASSOCIATION OF THE MEDICAL WOMEN'S FEDERATION
8.30 P.M. (B.M.A. House, Tavistock Square, W.C.1.) Dr. Marjorie Warren: Care of the Aged and Chronic Sick.

SOCIALIST MEDICAL ASSOCIATION
2.30 P.M. Lieut.-Col. T. F. Main: Mental Health Services.
7.30 P.M. Dr. H. Joules: Hospitals.

Wednesday, 6th

ROYAL SOCIETY OF MEDICINE
2.30 P.M. *History of Medicine*. Dr. E. Ashworth Underwood: The Influence of Joseph Priestley on the Medical Thought of the 18th Century.
8 P.M. *Surgery*. Mr. Norman Tanner, Mr. P. R. Allison: Carcinoma of the Cardia and Lower End of the Œsophagus.

ROYAL FACULTY OF PHYSICIANS AND SURGEONS, 242, St. Vincent Street, Glasgow, C.2
4 P.M. Prof. F. A. E. Crew, F.R.S.: Medico-Sociological Problems of an Ageing Population. (Finlayson lecture.)

SOCIALIST MEDICAL ASSOCIATION
2.30 P.M. Mr. A. W. Bourne: Mother and Child.
7.30 P.M. Dr. Stark Murray: The Health Worker.

Thursday, 7th

MEDICAL SOCIETY OF THE L.C.C. SERVICE
2.45 P.M. (Maudsley Hospital, Denmark Hill, S.E.5.) Cases.

EDINBURGH POSTGRADUATE LECTURES
4.30 P.M. (Royal Infirmary.) Dr. J. B. Dewar: X-ray Pelvimetry. (Honyman Gillespie lecture.)

SOCIALIST MEDICAL ASSOCIATION
2.30 P.M. Prof. J. R. Marrack: Food and Health.
7.30 P.M. Dr. J. Powell-Evans: The Doctor.

Friday, 8th

ROYAL SOCIETY OF MEDICINE
5 P.M. *Clinical*. (Cases at 4 P.M.)

INSTITUTE OF LARYNGOLOGY AND OTOLOGY, 330, Gray's Inn Road, W.C.1
4 P.M. Mr. F. C. Ormerod: Clinical Demonstration.

MEDICAL SOCIETY OF LONDON
5.30 P.M. Mr. A. W. Bourne: Toxæmia of Pregnancy. (Lectures for demobilised medical officers.)

SOCIALIST MEDICAL ASSOCIATION
7.30 P.M. Dr. Joan McMichael: Industrial Health.

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Obituary

COMYNS BERKELEY

KT., M.D., M.CHIR. CAMB., F.R.C.S., F.R.C.O.G.

ON Jan. 27, at the age of 80, Sir Comyns Berkeley, chairman of the Central Midwives Board, died at the Middlesex Hospital, from the staff of which he resigned in 1930. A man of remarkable energy and drive, he was personally known to gynæcologists in all parts of the world, having visited many of them in their own countries. By his colleagues here he will be remembered especially for his tenacious pursuit of what he thought right and for his loyalty to associates. Professionally he was best known for for his pioneer work with Mr. Victor Bonney on the operative treatment of carcinoma of the cervix. To Mr. Bonney we owe the following account of him:

Press Portrait Bureau

Comyns Berkeley was a man whose capacity for work and capacity for friendship were alike remarkable. Educated at Dulwich and Marlborough he came to Middlesex Hospital from Caius College, Cambridge, in 1888. He qualified in 1891 and was successively house-surgeon to Mr. (afterwards Sir) Henry Morris and Dr. William Duncan. During this latter appointment he began to coach in obstetrics and gynæcology and was soon recognised as a fine teacher. In 1895 he was appointed registrar and in 1897 assistant surgeon to Chelsea Hospital for Women. In 1901 an obstetric registrarship was created at Middlesex Hospital and the election, as it turned out, was a momentous one. By one vote Berkeley got the post over a heavily backed candidate from another hospital, and time proved how great was the service rendered by the late Mr. William Lang when he held up his hand for the home-grown product. In 1905 Berkeley became junior, and in 1908 senior, obstetric and gynæcological surgeon to the hospital, and he continued active staff work there for 25 years. Middlesex is deeply indebted to him. During his tenure of office and largely on his initiative his department was steadily expanded and a fine obstetric unit added. His good humour, tact, and sterling common sense perfectly fitted him to be a committee-man and he took part in every meeting concerned with the welfare and advancement of the institution. He taught assiduously up to the day of his retirement; he was for many years the leading spirit and treasurer of the Middlesex Hospital Club; he, with Herbert Charles, initiated the annual smoking concert and the annual dance and he was one of the first members of the Middlesex Hospital Lodge, while in the great work of rebuilding the fabric of the institution he played a prominent part. Nor was this all: many men from many generations of students owe him gratitude for sound advice and ungrudging help in times of doubt or trouble.

The foregoing by itself pictures a good life's work, but it was only a part of his. He was on the active staff of Chelsea Hospital for Women for 28 years and during that time accomplished a great amount of operative work, most of it major surgery. Taking all his hospitals together his surgical experience was very large: for example, by the time he retired he had performed Wertheim's operation between 300 and 400 times. He was for many years surgeon to the City Road Lying-in Hospital and there also he rendered services far beyond his strictly professional work, excellent as it was.

Those practising his specialty owe much to him, for he edited the *Journal of Obstetrics and Gynæcology of the British Empire* for a number of years and under his direction its reputation steadily grew. He contributed to the popular Ten Teachers' *Midwifery* and Ten Teachers' *Gynæcology* and edited a number of the editions, while his *Handbook of Midwifery for Nurses* and his *Gynæcology for Nurses* have been standard works for 30 years and have both been reissued many times. In collaboration with his junior colleague he published three books: *A Textbook of Gynæcological Surgery*, *Difficulties and Emergencies of Obstetric Practice*, and *A Guide to Gynæcology*, and (with Douglas Macleod added) *The Abnormal in Obstetrics* which appeared shortly before the late war. During the war of 1914–18 Berkeley and his junior colleague served as surgeons to the military branch of Middlesex Hospital at Clacton-on-Sea. It was a base hospital and they resided there by turns (at busy times both together) for the whole duration of the war, during which time over 10,000 wounded soldiers passed through their hands.

His accomplishment as an examiner was unique, comprising the universities of Birmingham, Bristol, Cambridge, Glasgow, Leeds, Liverpool, London, St. Andrews, Sheffield, Manchester, and Wales, the Conjoint Board and Apothecaries Hall. He was concerned in the development of radiotherapy, and in 1928 he was instrumental in securing the establishment of the radium centre for the treatment of carcinoma of the uterus under the Metropolitan Asylums Board and became its director. This centre was taken over shortly after by the London County Council and he remained its director until 1939. From about 1929 for several years he represented this country on the radiological subcommission of the League of Nations and he was chairman for a time. He made several official tours round the centres in Europe. He was also trustee and vice-chairman of the National Radium Commission.

From his early days the nursing profession was one of his great interests. He was treasurer for 21 years of the Royal British Nurses' Association and afterwards of the Royal College of Nursing which he helped to form, and he held the same position to the Cowdray Club for Nurses. For a long time he was one of the examiners of the Central Midwives Board; later he was on the board as representative of the Royal College of Physicians and finally in 1936 he succeeded Fairbairn as its chairman.

This record of work done, even in epitome, is an amazing one, and it might be thought that the spending of so much energy on intensive labour would leave little room for the graces and pleasures of existence. But not at all; he possessed a native humour, a geniality, a toleration, and a kindness of heart which made him an ideal companion, and at any social gathering, private or public, where fun and good fellowship was called for he was a priceless asset. A bon-viveur by nature and inheritance, joying in good company, especially when it was intimate and gossipy, and possessing an intense relish for the pleasant things of life, he held with the poet that "laughter and the love of friends" were, of all things, the most worth winning. Like many other of his host of friends I shall always remember with affectionate regret the dinners, perfect in substance and service, that he used to give at his own house or at the Garrick, nor less those jovial suppers of perfect Stilton and audit ale which at 2 A.M. succeeded several hours spent in hard literary work.

He travelled much, having been to both North and South America, South Africa, Egypt, the Mediterranean, and most parts of Europe. He was an active Freemason and had passed through the chair of several lodges. At one time he was a keen shot and also a devotee of golf until an unfortunate accident to his knee restricted his physical activities.

In the last few years of his life domestic misfortune beset him; his house in Wimpole Street was badly damaged by a bomb, as likewise was the house he removed to and the office wherein he worked, and presently his health began to fail. Nevertheless with indomitable resolution he continued in London, editing his journal and presiding over his board, and undismayed carried on as long as he could.

In paying this tribute to the life's work of a very old and loved colleague and friend, I cannot but think it teaches two great lessons: first, what enormous capability there is in unfaltering persistence—in 47 years I never saw Berkeley lounge or be idle; he was always doing something: and secondly, that time is much more spacious than most of us think, there being within it, if fully utilised, ample room both for great work and great play.

V.B.

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JOHN FALCONER HALL

C.M.G., M.B. ABERD.

Surgeon Rear-Admiral Falconer Hall, who died on Jan. 15 at the age of 73, had a distinguished career both in the Navy and later as a commissioner of the Board of Control. Qualifying from Aberdeen in 1893, he joined the Navy two years later and was mentioned in despatches for service on the China station. In 1902 he won the Gilbert Blane gold medal. In the war of 1914–18 he served with the Grand Fleet and was at Gallipoli as senior medical officer of the hospital ship *Soudan*, again receiving mentioned in despatches. He was appointed senior assistant to the medical director-general at the Admiralty, and on promotion to surgeon captain acted as deputy director-general for a year. In 1919 he was appointed C.M.G., and in 1920 he became second-in-command of the Royal Naval Hospital, Haslar, where he took special interest in the treatment of mental and nervous illnesses. Following his promotion, in 1923, to the rank of surgeon rear-admiral, he was given command of the Royal Naval Hospital, Malta, and remained there until 1926, when he became the naval member of the Admiralty Medical Consultative Board. He was an honorary surgeon to the King.

After retirement from the Navy he was appointed in 1927 an inspector, and in 1931 a commissioner, of the Board of Control, with which he remained until 1938, when he retired to Chudleigh, Devon, to devote himself to his family and his hobby, stamp-collecting. He retained an active interest in medicine, and in 1942 was elected president of the United Services section of the Royal Society of Medicine.

"Whenever extra work loomed ahead," writes a colleague, "Falconer Hall was always ready; and until recent years, when physical disability compelled him to take life more easily, he was always busy with his own work or helping to find employment for ex-Naval men who had a knowledge of nursing. He held strong views on subjects in which he was interested; but his manner was so gentle and agreeable that, while winning many friends, he made no enemies. By those who worked with him his memory will be treasured."

EDWARD ALEXANDER STRACHAN

M.B. EDIN.

Lieut.-Colonel E. A. Strachan, who died in London on Nov. 22 at the age of 59, graduated at Edinburgh in 1908 and joined the R.A.M.C. four years later. During the 1914–18 war he served in Mesopotamia, and was mentioned in despatches. In 1927 he became physician and surgeon to the Royal Hospital, Chelsea, and in 1934 he was appointed surgeon lieut.-colonel to the Life Guards. He was also officer in charge of the Household Cavalry Hospital, Knightsbridge. Soon after war broke out in 1939 he became A.D.M.S. of the 1st Cavalry Division and later he was A.D.M.S. in the North Highlands area. In 1940 he was posted to Palestine for a period.

"Eddie Strachan," writes D. T. R., "had two qualities which I admire above all others, a stark honesty, and true loyalty to his friends. It was these attributes, together with a gentle simplicity and dry humour, that so endeared him to us all. A pawky golfer with an extraordinary skill at the short game, it was his sheer pleasure that made him an ideal partner or opponent, and indeed it would be a poor sportsman who did not succumb to the infection of his spirit on the links. He regularly attended the Army golf championship and during his secretaryship of our own association golf in the Corps was never more popular, undoubtedly because of his enthusiasm and keenness."

THE trustees of the Tata Memorial Trust invite applications, from candidates of any nationality and in all countries where sterling may be paid, for grants and scholarships for research in blood diseases with special reference to leukæmia. Scholarships are normally awarded as a personal remuneration of £400 per annum, with proportional adjustment for part-time work. Applications should be submitted before March 16 to the secretary of the scientific advisory committee of the trust, c/o the Medical Research Council, 38, Old Queen Street, Westminster, London, S.W.1. The awards will be announced in June and cover the academic year beginning Oct. 1, 1946.

Appointments

ALLEN, C. P., F.R.C.S.: R.S.O., King George Hospital, Ilford.
BATES, R., F.R.C.S., D.P.M.: med. superintendent, Royal Eastern Counties Institution, Essex Hall, Colchester.
BOYD, J. T., M.B. Glasg.: tuberculosis physician, Ayrshire Central Hospital, Irvine, and Glenafton Sanatorium, New Cumnock.
CUTHBERT, JAMES, M.D. Glasg.: R.M.O., Glenafton Sanatorium, New Cumnock.
DAVIDSON, WILLIAM, M.B., D.P.H.: temp. asst. T.O. for Gloucestershire and asst. M.O. at the Standish House Sanatorium.
ELLIOTT, Captain T. K., M.B. Lond., A.C.S.M.: M.O. for mines in the Midland region.
GLEDHILL, W. C., M.B.E., M.B. Sydney, F.R.C.S., D.L.O.: temp. hon. asst. surgeon in ear, nose, and throat department, Northampton General Hospital.
* GUTHKELCH, A. N., F.R.C.S.: chief asst. to the university department of neurosurgery at the Manchester Royal Infirmary.
HAMILTON, C. J. K., M.B. Camb., F.R.C.S.E., M.R.C.O.G.: temp. hon. asst. surgeon, Women's Hospital, Liverpool.
HARAM, BEATRICE, L.R.C.P.: pathologist, Elizabeth Garrett Anderson Hospital, London.
HARRISON, M. S., M.D. Edin., M.R.C.P.E., F.R.C.S.E.: hon. surgeon i/c of the ear, nose, and throat department, Lincoln County Hospital.
HARRISON, S. H., F.R.C.S.E.: asst. surgeon, Birmingham Accident Hospital.
KIRKMAN, N. F., M.D. Manc., F.R.C.S.: temp. R.S.O., Withington Hospital, Manchester.
MARTIN, J. R., M.B. Lond., D.M.R.E.: radiological registrar, General Hospital, Nottingham.
MOGG, R. A., F.R.C.S.: temp. R.S.O., Llandough Hospital, Cardiff.
OVEREND, T. D., L.R.C.P., D.M.R.E.: temp. hon. radiologist, West Kent General Hospital, Maidstone.
RIDDLE, W. G. A., M.B. Durh.: surgical registrar to the orthopædic department, Royal Victoria Infirmary, Newcastle-on-Tyne.
SEVITT, SIMON, M.D., M.SC. Dubl., D.P.H.: temp. asst. pathologist, central laboratory, Kent public health department.
THOMSON, J. M., M.B. Glasg., D.O.M.S.: hon. ophthalmic surgeon, Torbay Hospital, Torquay.
TOMLINSON, K. M., M.R.C.S.: registrar to the skin department, Coventry and Warwickshire Hospital.
TURNEY, H. F., D.M. Oxfd, M.R.C.P.: hon. physician to department of physical medicine, King George Hospital, Ilford.
WINGFIELD, ALEC, M.D. Lond., M.R.C.P.: temp. hon. physician, Willesden General Hospital.

Middlesex Hospital, London.—The following appointments have been made:
COLSON, G. M., B.M. Oxfd: acting medical registrar.
DYSON, W. H., L.R.C.P.: acting surgical registrar.
PALMER, K. N. V., M.B. Camb., M.R.C.P.: acting medical registrar.

The following factory surgeons have been appointed:
BOARDMAN, H., M.B. Manc.: Melbourne, Derby.
BRISK, H. L., M.B. Manc.: Rhyl, Flint.
JAMIESON, J. M. M., M.B. Edin.: Ballachulish, Argyll.

Births, Marriages, and Deaths

BIRTHS

BUCKLEY.—On Jan. 16, the wife of Dr. John Buckley, of Bramcote, Notts—a son.
CASSELLS.—On Jan. 18, the wife of Dr. John Cassells, of Hartwood—a daughter.
MACNAIR.—On Jan. 19, in Edinburgh, Dr. Margaret Macnair (*née* Cameron), the wife of Major J. T. Macnair, M.C., R.A.—a son.
MORGAN.—On Jan. 20, Dr. Elizabeth Morgan (*née* Tylden), the wife of Dr G. D. Morgan, of Albion Street, W.—a daughter.
MURRAY.—On Jan. 15, at Aberdeen, the wife of Captain R. G. Murray, R.A.M.C.—a daughter.
NEILL.—On Jan. 19, at Leeds, to Dr. Joyce Neil (*née* Gibbon Davies), the wife of Mr. Desmond Neill—a daughter.
NORTH.—On Jan. 24, at Weybridge, the wife of Surgeon Lieutenant John North, R.N.V.R.—a daughter.
RICE-OXLEY.—On Jan. 22, at Oxford, the wife of Captain J. M. Rice-Oxley, R.A.M.C.—a son.
ROFFEY.—On Jan. 8, at Bessels Green, Sevenoaks, the wife of Dr. Alec Roffey—a daughter.
STONEHAM.—On Jan. 13, in London, the wife of Dr. F. J. Russell Stoneham—a daughter.

MARRIAGES

JACK—HARDMAN.—On Jan. 11, in Alexandria, Virginia, U.S.A., Nelson Briggs Jack, M.D., to Freda Mary Hardman.
SLATER—HAWARD.—On Jan. 17, at Manchester, Henry Bertram Slater, M.B., to Francoise Haward.

DEATHS

ADAMS.—On Jan. 26, at Great Gransden, Bedfordshire, James Wilmot Adams, M.B. Camb., F.R.C.S., formerly of Penang.
DOYLE.—On Jan. 21, at Watford, Edward Angel Gaynes Doyle, M.R.C.S., formerly of San Fernando, Trinidad, aged 86.
FRAZER.—On Jan. 19, at Teddington, Robert Bruce Fair Frazer, L.R.C.P.E., barrister-at-law, husband of Dr. Kathleen Frazer, aged 58.
HAYWARD.—On Jan. 27, at Cheltenham, William Curling Hayward, M.B.E., M.B. Durh.
MCANALLY.—On Jan. 17, at Eastry, Kent, Archibald Acheson McAnally, M.R.C.S., aged 85.
MCDOUGALL.—On Jan. 22, at Limpsfield, Surrey, James Edlington McDougall, M.B. Vict., formerly of Liverpool.
PLATT.—On Jan. 20, at Underriver, Arthur Ferdinand Rowley Platt, M.B. Edin., aged 82.

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* Subject to obtaining release from military service under class B.

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Notes and News

"SAVE EUROPE NOW"

A MEMORIAL urging that general rations in this country should not be increased while there is famine on the Continent was lately presented to the Prime Minister by Mr. Victor Gollancz. The memorial was signed by the Archbishops of Canterbury and Westminster and heads or leading members of many other religious denominations; 95 bishops, deans, and archdeacons; 87 members of Parliament; the president, secretary, and 77 other fellows of the Royal Society; the vice-chancellors of Oxford and six other universities, Dame Janet Campbell, Lord Horder, Sir Charles Martin, Prof. J. A. Ryle, Sir Almroth Wright, Sir Adolphe Abrahams, Sir Joseph Barcroft, Miss Harriette Chick, D.SC., Prof. F. A. E. Crew, to name but a few of a long list of doctors and nutritionists, and 60,000 other distinguished men and women and rank-and-file citizens. In a reply, dated Jan. 25, and published in the *Times* of Jan. 29, Mr. Attlee said that the Government were not prepared to give so wide an undertaking, though there was little prospect of any substantial increase in home consumption while world supplies were so low. It might be necessary to provide some variation of our present monotonous diet to increase production. The Government had already done their utmost to send relief to Europe and would continue to do so. Any further increase in food-supplies to Europe must come from the food-exporting countries.

NEW HOSPITALS FOR EUROPE

EQUIPMENT for a 1000-bed hospital, first of thirteen purchased by UNRRA for shipment to Poland and Czechoslovakia, has been despatched from Britain; it is expected that the remainder will have been delivered by the end of this month. In all, the equipment, which belonged to the U.S. Army and was intended for use in the Far East, is enough for eleven 1000-bed general hospitals, one 750-bed evacuation hospital, and one 400-bed field hospital. Each unit includes beds and bedding, laboratory, operating-theatre, X-ray department, kitchen, laundry, medical library, drugs, and pyjamas.

A complete mobile hospital unit of 400 beds has been organised by the Paderewski Memorial Hospital in Edinburgh. This was to have gone to Germany for the treatment of Polish displaced persons and former prisoners; but, since Polish staff to operate the hospital in Germany cannot be found, it will be sent direct to Poland.

DIETITIANS: THE GROWING ROLL

DIETITIANS seem to have found the recipe (which eluded Old Man Kangaroo) for being truly sought after. Demands for their services far exceed their numbers. However, the second edition of the register of dietitians, published by the Board of Registration of Medical Auxiliaries, shows that there are now 183 of them in England, Wales, and Scotland—an increase of 41 since last year. All who appear on the register have been duly trained, and examined by the British Dietetic Association, and they are recommended to doctors, hospitals, education authorities, and others. The register, which gives addresses as well as names, may be obtained free of charge from the registrar of the board, at B.M.A. House, Tavistock Square, London, W.C.1.

THE SICK KIDS OF TORONTO

THE Victoria Hospital for Sick Children in Toronto has never been known very widely by its full name. The board and staff forget to mention "Victoria," the general public say "Sick Children's Hospital," and the students call it "The Sick Kids." It began with six cots in 1875 and soon after was adopted by Mr. J. R. Robertson, publisher of the *Toronto Telegram*, who contributed to it lavishly while he lived and when he died bequeathed it ten thousand dollars a year and the residue of his estate. The hospital building on College Street has been extended several times through the years, and it has been affiliated with the University of Toronto for clinical teaching. About 25 years ago research laboratories were opened, in which Gallie and LeMesurier did their experiments on the use of fascia in the repair of herniæ, and a multitude of valuable contributions have been made to pædiatrics, nutrition, and orthopædic surgery. The exsanguination transfusion treatment of severe burns originated at the Victoria Hospital and the treatment of acute osteomyelitis and rehabilitation after anterior poliomyelitis have gained from practices begun there.

Now the old building has become obsolete and new quarters must be secured. A large block of land south of the Toronto General Hospital on University Avenue has been secured and the public is asked to provide four million dollars to supplement the grants of a million each from the city of Toronto and the province of Ontario. There seems to be little doubt that this huge sum will be subscribed.

University of Oxford

Francis Gotch Memorial Prize.—An examination for this prize will be held in Oxford on March 2. Candidates should send their names and qualifications to the board of management of the department of physiology by Feb. 23.

University of Cambridge

On Jan. 25 the following degrees were conferred:—

M.D.—*J. F. Paterson.

M.B., B.Chir.—*C. C. D. Shute, *R. H. Thomlinson, P. A. Merton, *William Buckley, *H. G. Percy, *R. C. Allison, *E. W. Deane, A. E. Flatt, John Jordan, *C. J. Wilson, B. R. Pollard, J. T. Rowling, R. H. Wilkinson, P. B. Kunkler, *John Gloster, *David Hamilton, *D. J. ap Simon, Paul Watson, *P. D. Mort, *J. W. T. Redfearn, J. C. Bayliss, *A. McK. Elliott, *A. L. Furniss, *E. B. G. Smith

* By proxy.

Royal College of Obstetricians and Gynæcologists

At a meeting of the council held on Jan. 26, with Mr. Eardley Holland, the president, in the chair, the following were elected to the membership:

Constance L. Beynon, E. W. C. Buckell, Walter Calvert, R. G. Cross, S. N. Gardé, Perla Greeves, Emilie E. Guthmann, W. P. Hirsch, William Kearney, A. H. C. Walker, Margaret Weddell, May D. Westerman.

Postgraduate Courses in Glasgow

Postgraduate courses in medicine and in surgery will be held at the University of Glasgow from March 11 to April 13. Applications should be sent to the convener of the Committee on Postgraduate Medical Education, The University, Glasgow, W.2, and further particulars will be found in our advertisement columns.

Postgraduate Lectures in Edinburgh

During the spring term the following Honyman Gillespie lectures will be given on Thursdays: Dr. J. B. Dewar, X-ray Pelvimetry (Feb. 7); Dr. J. P. Stewart, Experiences of an Otologist on Active Service (Feb. 14); Dr. Robert Lees, Penicillin Treatment of Venereal Diseases (Feb. 21); Mr. J. J. M. Brown, Experience at a Centre for Blood-vessel Injuries during the Italian Campaign (Feb. 28); Mr. John Bruce, Forward Surgery in an Eastern Setting (March 7); and Dr. E. L. Farquharson, Surgery of the Hand and Fingers (March 14). All the lectures will be held in the west medical theatre of the Royal Infirmary, at 4.30 P.M.

Royal Institution Lectures

The first of four weekly lectures on Recent Advances in the Physiology of Vision was given on Jan. 29 by Prof. Hamilton Hartridge, F.R.S., who will also speak on March 1 on Acoustic Control of the Flight of Bats. On Thursdays from Feb. 28 to March 21 Sir Henry Dale, O.M., F.R.S., will lecture on Chemical Transmitters of the Effects of Nerve Impulses, and on April 5 Sir Edward Mellanby, F.R.S., on Medical Research in War and Peace. All meetings will be held at 5.15 P.M. at 21, Albemarle Street, London, W.1.

M.O.H. Appointments in Germany

Doctors obtaining the M.O.H. appointments in Germany, for which applications are invited in our advertisement columns, will have the interesting job of building up the German public-health organisation from its present state of confusion. The reopening of medical schools and hospitals, the control of medical supplies, and the medical supervision of returning refugees and displaced persons will be among their tasks, as well as routine M.O.H.'s duties. Those who fill these posts will be doing valuable and essential work.

Royal Medical Benevolent Fund

At a quarterly meeting of the committee of management, held in London on Jan. 23, Sir Arnold Lawson, the president, reported that Christmas gifts had exceeded the record, and that £2127 had been distributed. The problem of finding a house in London or the Home Counties as a home for beneficiaries was proving very difficult, and more money would be needed for this enterprise. It was decided to include a representative of the Medical Women's Federation in the committee, and to resume, in 1947, publication of the annual report which has been suspended during the war. The committee will in future meet every two months.

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CHEMOTHERAPY OF PNEUMOCOCCAL MENINGITIS *

HONOR V. SMITH M.B., B.Sc. Lond.
E. S. DUTHIE † M.B., Ph.D. Dubl.
H. CAIRNS D.M. Oxfd, B.S. Adelaide, F.R.C.S.
NUFFIELD DEPARTMENT OF SURGERY, OXFORD

THE value of penicillin in pneumococcal meningitis is now established. That purulent meningitis could be controlled by intrathecal injections of penicillin was shown in 1942, when Fleming successfully treated a case of streptococcal meningitis (Florey and Florey 1943, Fleming 1943). In April, 1943, we treated our first case of pneumococcal meningitis, and in the following year published a report of 16 fully-treated cases with 4 deaths (Cairns, Duthie, Lewin, and Smith 1944). Since then we have treated a further 18 patients; all recovered from their meningitis; but one, whose meningitis followed a road accident, subsequently died of fat-embolism. Successful results have also been reported from America, where Waring and Smith (1944) described a series of 12 cases with 11 recoveries. But treatment is, as we shall show, by no means a matter of simple routine; 3 cases have been described by Bloomfield, Kirby, and Armstrong (1944) in a paper entitled "The Failures of Penicillin," while Sweet and his colleagues (1945) have reported a series of 16 cases with only 7 recoveries, and Appelbaum and Nelson (1945) a series of 67 cases with 26 recoveries. We propose here to discuss the principles of treatment and their practical application, the methods we have used, the difficulties and dangers of treatment, and the causes of failure.

Sulphonamides.—Our first 16 patients had all received sulphonamides before admission, but as we were anxious to obtain clear-cut observations these were stopped when treatment with penicillin was begun. The pre-penicillin course of these cases gave abundant evidence of the value of sulphonamides in preventing or delaying clinical deterioration, although the drug had not sterilised the cerebrospinal fluid nor cured the patient.

CASE 1 (R.I. 5693/44).—A housewife of 72 developed pneumococcal meningitis after acute frontal sinusitis. She was drowsy, irrational, and her cerebrospinal fluid was turbid, though culture was sterile. She was immediately treated with sulphadiazine (12 g. daily) and responded well: headache and neck stiffness diminished, her temperature fell to normal, and she became lucid. On the fourth day of treatment the cerebrospinal fluid was almost clear, but pneumococci were grown on culture. Clinical relapse followed within 6 hours of lumbar puncture.

This and similar experiences showed the limitations of sulphonamides, but also convinced us that when given early and in adequate doses sulphonamides were able, at least for a time, to suppress the intensity of the infection in all except the fulminating cases. Therefore, as we had obtained clear proof of the curative action of penicillin, and as it had been shown that penicillin and sulphapyridine were not antagonistic (Ungar 1943), we decided to treat future cases with sulphonamides and penicillin combined. Sulphonamides have the important advantage that they can be given by mouth and can pass freely from the blood into the cerebrospinal fluid. Our last 18 fully-treated cases have received both sulphadiazine and intrathecal penicillin, and all have recovered from their meningitis.

Routine of Treatment

Our methods of treatment have changed in detail as purer penicillin has become available in increasing quantities. The following scheme has proved effective in uncomplicated cases (figs. 1 and 4). As soon as a diagnosis of meningitis is made, lumbar puncture is performed; a gram-stained film of the cerebrospinal fluid is examined for organisms, and cultures are put up with *para*-aminobenzoic acid. In two cases (excluded from this series) which showed morphological pneumococci in the films, cultures were probably negative because this was not done. Once pneumococci are seen—and often the fluid is swarming with them—a lumbar injection of 8000–16,000 units of penicillin (2000 u/c.cm.) is given, with a smaller range for infants. Systemic penicillin treatment is begun either by intermittent 3-hourly injections or a continuous intramuscular drip, and 120,000 units given in 24 hours. In this dose no appreciable amount penetrates the theca; it is given to control the primary infection, and the septicæmia which may complicate the meningitis. Sulphadiazine is given by mouth or nasal tube in doses of 2 g. every 4 hours, following an initial dose of 4 g., with the usual precautions against renal block.

Within 18 hours—usually 12—another lumbar injection of penicillin is given. The cerebrospinal fluid should by now be sterile and the film show a dramatic decrease in the number of organisms. In fact, we have never seen more than a few degenerate organisms at this stage, even in cases which ultimately proved fatal. The fact that the cell content of the fluid has usually increased is not in itself disquieting, but if the fluid is perceptibly thicker than on the previous occasion it is probably wise to do the third puncture 12 hours later, to make sure of detecting any incipient block requiring ventricular injections. Thereafter daily injections are usually sufficient, but even in the mildest cases these must be continued for at least 5 days, otherwise the meningitis may relapse. After 4–5 days intramuscular penicillin can be stopped, and sulphadiazine cut down to 1 g. 4-hourly; this dose should be maintained for a week in order to cover the period of withdrawal of the intrathecal penicillin. If the patient does not tolerate sulphadiazine well it can be stopped while the intrathecal injections are being given and begun again on the day of the last injection.

Although the cerebrospinal fluid should become and remain sterile after the first injection of penicillin, there is as a rule little change in the patient's condition for at least 24 hours, and often the only sign of improvement is the disappearance of organisms from the

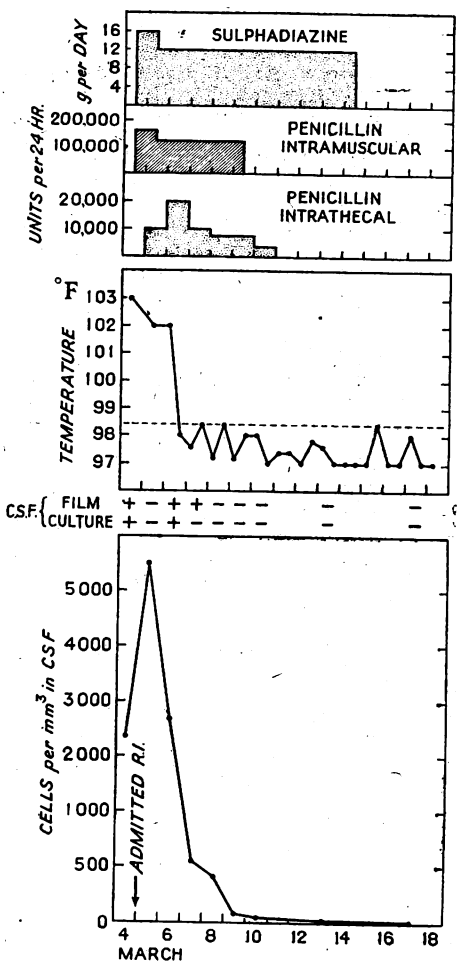

Fig. 1—The temperature, C.S.F. changes, and treatment in an uncomplicated case of pneumococcal meningitis. A girl aged 12. (R.I. 37668/45.)

* Based on a paper read to the Neurological Section of the Royal Society of Medicine on March 1, 1945.

† With a grant from the Nuffield Provincial Hospitals Trust.

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direct film. During the next two days his temperature and pulse-rate fall, his delirium and stupor lessen, he becomes able to swallow, and regains control of his sphincters. But, however good his response, the first 24–36 hours should always be regarded as a period of great anxiety and one in which the general nursing care and the maintenance of a good fluid intake may make the difference between failure and success.

During the acute phase of the illness adult patients are often wildly delirious, while fits are, on the whole, uncommon. Regular doses of phenobarbital and occasional intramuscular injections of paraldehyde are needed chiefly for control of the delirium, and when this is effected the tendency to fits is also controlled. Infants and small children, on the other hand, are usually profoundly prostrated, semi-comatose, and prone to status epilepticus. The fits may be focal in distribution, and when the child is wrapped up all that may be visible is a little twitching of one side of the face. In one of our infant patients an oft-repeated meningeal cry was associated with momentary conjugate deviation of the eyes to the right and was undoubtedly epileptic. Fits are as dangerous to the infant as the toxæmia of the infection, and their prevention or control is imperative.

This scheme of treatment represents the safe minimum in an uncomplicated case, and will suffice in perhaps half the cases. But if the mortality of pneumococcal meningitis is to be reduced to the neighbourhood of 10%—and there is now no valid reason why it should not be so reduced—each case must be studied closely and treatment modified in accordance with the needs of the individual and the principles on which treatment is based.

Principles of Treatment and their Application

The principles on which we base our methods are: (1) early institution of treatment; (2) free access of adequate amounts of penicillin to all parts of the cerebrospinal pathways; (3) maintenance of an adequate concentration of penicillin in the cerebrospinal fluid for a sufficient length of time; (4) treatment of the primary focus.

(1) EARLY INSTITUTION OF TREATMENT

It is neglect of this principle which causes the greatest number of failures. In addition to our fully-treated cases, we have had 4 in which the patient was moribund by the time the diagnosis was made. Subsequent attempts at treatment, including intrathecal and massive intramuscular injections of penicillin, were ineffective, and all the patients died within the next few hours.

Delay in instituting treatment is usually due to delay in diagnosis. The onset may be fulminating, acute, or insidious. In the fulminating type the onset may be as abrupt as that of subarachnoid hæmorrhage, and the diagnosis is only made when on lumbar puncture the cerebrospinal fluid is found to be purulent. When the onset is insidious the patient is usually already ill with pneumonia, sinusitis, or otitis media, and the signs of meningitis may be negligible, or masked by those of the primary infection.

CASE 2 (R.I. 32029/44).—An insurance agent, aged 55, developed right otitis media which responded promptly to sulphapyridine. During the ensuing 8 months he had frequent attacks of severe headache, vomiting, malaise, and shivering, with fever up to 104° F. The attacks subsided promptly with sulphonamides, but in the interval some headache persisted, he lost 2 stone in weight, became anxious and quite unable to work, and in the attacks he was mentally confused. Eventually, after several examinations had revealed no physical signs, he was admitted as a voluntary patient to a mental hospital. Here he had a febrile attack of the usual kind which subsided within 24 hours, but 2 days later it was observed that his neck was rigid, and a lumbar puncture was done. The cerebrospinal fluid was turbid and contained 480 white cells, mostly polymorphonuclears, per c.mm., total protein 300 mg. per 100 c.cm., and pneumococci in films and cultures. In another attack the cerebrospinal fluid contained 5000 white cells per c.mm., and a few pneumococci. X-ray films showed infection of the mastoid cells, and right mastoidectomy was performed, 2 days after which he had a fit, followed by restlessness and confusion. In this state he was admitted to the Radcliffe Infirmary.

He was emaciated, demented, and showed the signs of a moderately severe meningitis. The cerebrospinal fluid contained a pneumococcus which could not be typed. There was a right jugular block, suggesting thrombosis of the right lateral sinus. He responded promptly after one course of intrathecal and systemic penicillin, and within a month the jugular block had disappeared. In spite of reappearance of pneumococci in the cerebrospinal fluid on one occasion 6 weeks after the conclusion of penicillin treatment, he had no more attacks of meningitis. He gradually recovered his weight, well-being, and intelligence, and returned to work 8 months after penicillin treatment.

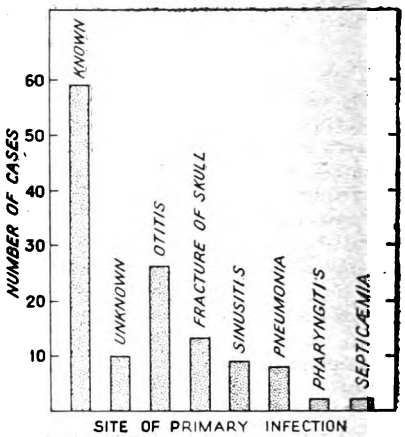

Fig. 2—Analysis of 71 cases of pneumococcal meningitis from the records of the Radcliffe Infirmary and the Military Hospital for Head Injuries, showing the high incidence and the site of an overt primary focus of infection.

The type with an acute onset is the commonest; the diagnosis is seldom difficult, except in infants,‡ and delay in instituting appropriate treatment is usually due to delay in identification of the infecting organism. When no bacteriological facilities exist some delay is inevitable, and it is therefore necessary to formulate an immediate line of action in regard to chemotherapy for the doctor who, suspecting meningitis, has done a lumbar puncture and has found turbid cerebrospinal fluid.

The case may be one of meningococcal, pneumococcal, or streptococcal meningitis, or the infection may be tuberculous or due to *H. influenzæ*. Other infections are uncommon in this country. In any case, from the practical point of view it is imperative that treatment with full doses of sulphonamides should be begun immediately. We emphasise the words "full doses," because too often we have seen that sulphonamide chemotherapy has been half-hearted. The best sulphonamide for meningeal infection at present available is sulphadiazine, but if this be not to hand it is better to begin treatment immediately with sulphamezathine, sulphapyridine, sulphathiazole, or sulphanilamide, in that order of preference, rather than to delay until sulphadiazine has been obtained. Every doctor called to see a suspected case of meningitis should carry a soluble sulphonamide preparation in his bag, for in the acute stage of their illness patients are often vomiting or unconscious, when intravenous or intramuscular injections are needed.

Should penicillin be given intrathecally at the first tap before the lumbar puncture needle is withdrawn? By no means in every case. In meningococcal meningitis it is usually unnecessary; in streptococcal meningitis it may be dangerous; and in all cases, especially in a private house, it carries some risk of secondary infection by introducing penicillin-resistant organisms. Even in pneumococcal meningitis immediate intrathecal treatment is required only by the very severe case.

Where bacteriological facilities are not available the differential diagnosis must be attempted on clinical grounds. There is a useful point of differentiation between pneumococcal meningitis and the commoner meningococcal variety. In at least 4 out of every 5 cases of pneumococcal meningitis a primary focus of infection can be detected (fig. 2); the signs and symptoms of the primary infection are often mild. In meningococcal meningitis a primary focus other than a mild pharyngitis is exceptional. Streptococcal meningitis and infections due to *H. influenzæ* cannot be distinguished clinically from pneumococcal meningitis, since

‡ An excellent account of the diagnosis of meningitis in infants has been given by Alexander and Ellis (1942).

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an overt primary focus of infection is common in all three varieties.

Streptococcal meningitis is frequently associated with intracranial abscess: in 8 consecutive cases of streptococcal meningitis abscess was present in 6. In such cases lumbar puncture carries a risk which does not seem to be lessened by intrathecal injections of penicillin. As soon, therefore, as streptococci are identified in the cerebrospinal fluid the presence of an abscess should be excluded or confirmed by ventricular estimation or ventriculography before proceeding to the routine treatment of the meningitis.

In fulminating cases of any type of meningitis in which a primary focus of infection is present it is probably unjustifiable to withhold intrathecal penicillin until a bacteriological diagnosis is made, since sulphonamides alone seem powerless to alter the course of events. The severity of the infection should be assessed from the suddenness of the onset of symptoms, from the degree of toxæmia, and from the history of rapid deterioration. These cases are among the most acute of all medical emergencies. If untreated the disease may run its full course in 24 hours, and a delay of 1 or 2 hours in beginning treatment may make the difference between death and complete recovery. The following was a fulminating case.

CASE 3 (R.I. 23632/44).—A schoolboy of 15 had an attack of right-sided otitis media in December, 1943. This responded well to sulphonamides, and he returned to school the following term. At 4 P.M. on April 14, 1944, he had a recurrence of his earache, and his temperature rose to 102·5°. The ear was examined, and though the tympanic membrane was reddened no indication for operation was found. He was given 2 g. of sulphadiazine and thereafter received 1 g. every 4 hours. Next morning at 4 A.M. he awoke complaining of headache, and vomited. By 9.30 A.M. he was drowsy and confused, by 11.30 A.M. he was delirious and there was considerable neck-rigidity; the tympanic membrane was bulging. He was transferred to a nursing-home where at 2.30 P.M. a myringotomy was performed and a fair quantity of pus released, without any improvement in his general condition. Since he was by now unable to swallow, the sulphadiazine was continued by intramuscular injection.

By 5.30 P.M. he was desperately ill: there was pronounced head-retraction, he was cyanosed, and his respirations, which had risen to 40 per min., were interrupted by bursts of hyperpnœa when the rate would rise to 60 or even 70. He was mute and restless, and any interference provoked paroxysms of violent but silent struggling. There was a right facial weakness of lower motor neurone type, but no other focal signs. Lumbar puncture yielded turbid fluid under a pressure of over 300 mm. of water, and examination of a smear of the cerebrospinal fluid showed gram-positive diplococci.

By 7 P.M., when he came under our care, he seemed in extremis. At this stage treatment was begun with intrathecal and intramuscular injections of penicillin. During the next 24 hours there was little change in his general condition beyond the fact that the rapid deterioration had ceased. He developed a monoplegia of his right arm, and in order to exclude a localised collection of pus bifrontal burr-holes were made and his lateral ventricles tapped. Both were patent and therefore intracranial abscess seemed unlikely. Twenty-four hours after treatment was begun his temperature fell, and after 5 days' intrathecal penicillin therapy he made an

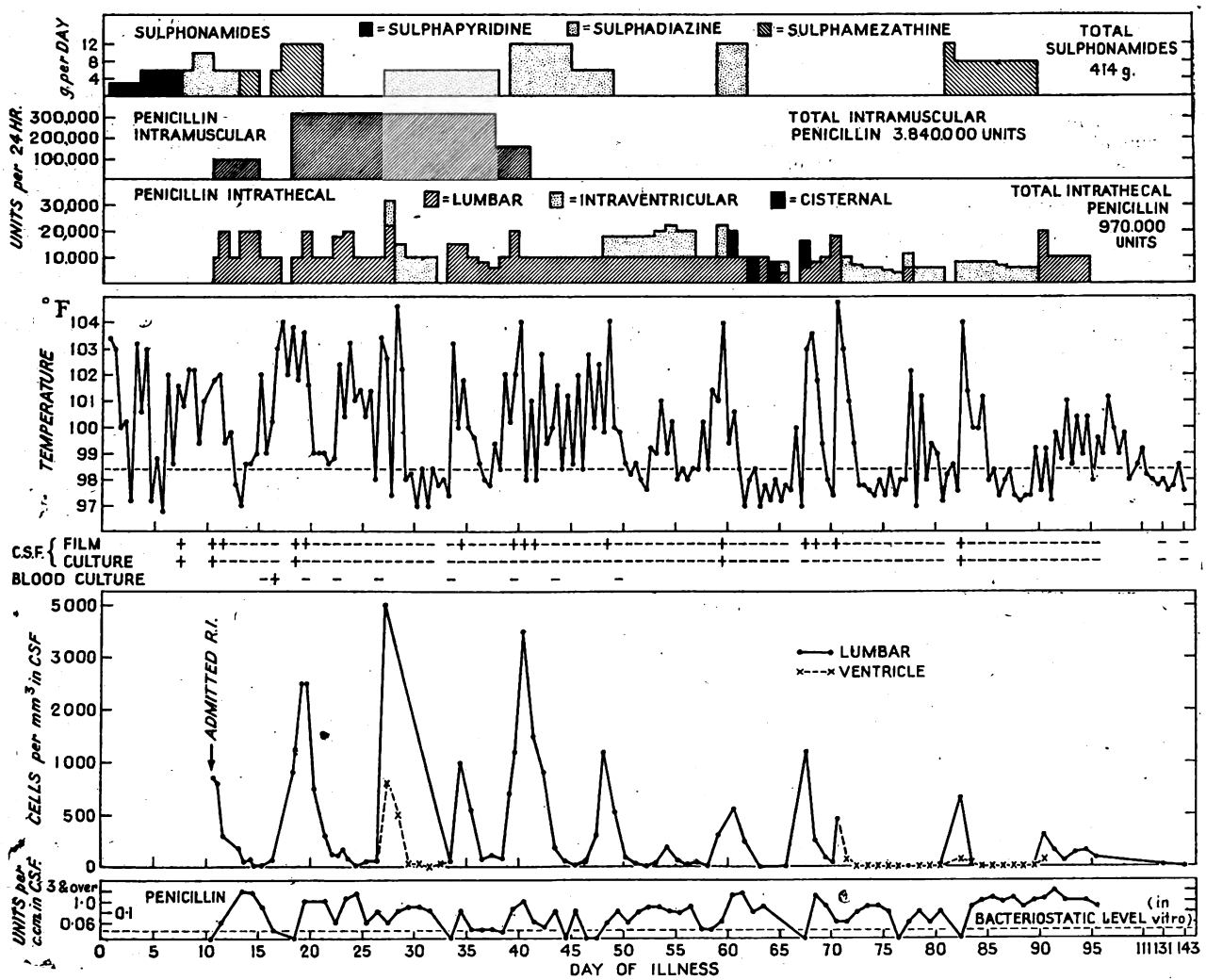

Fig. 3—The temperature, C.S.F. changes, and treatment in a relapsing case of pneumococcal meningitis. (R.I. 38747/45.) Note that each peak of pleocytosis of the C.S.F. is preceded by a fall in the penicillin content, usually below the in-vitro bacteriostatic level.

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PENICILLIN CHART - CEREBROSPINAL FLUID IN MENINGITIS.

Name 23750/45 Age 18. Organism Pneumococcus Type I Sensitivity ++ Hospital Radcliffe Infirmary

Date of Onset of Meningitis 31-1-45 Source of Meningitis Ethmoid sinusitis Date of Admission 3-2-45 Ward Alexander

Parenteral Penicillin 3-2-45 - 8-2-45 } 1,000,000
(Dates & Total Amount) 15-2-45 - 19-2-45 }

Date	Time	Route of Puncture	Pressure	Films	Cultures	Pen. Content	White Cells Total	Polys.	Monos	Total Protein mgm. %	Chlorides	Sugar	Pen. I-Th. Units	Remarks
3-2-45	20.30	Lumbar	300 +	Pneumococci +++	Pneumococci	—	500	92%	8%	240	680	Nil	12,000	Intramuscular penicillin begun 15,000 u 3 hourly
4-2-45	11.30	"	?	No organism	Sterile	Nil	280	88%	12%	120	730	Normal	10,000	
	20.45	"	170	Degenerate organisms	"	2.0 u/cc	405	91%	9%	?			8000	
5-2-45	16.30	"	180	V. few degenerate organisms	"	0.15 u/cc	900	80%	14%	160-180	?	?	8000	
6-2-45	16.30	"	180	No organism	"	0.03 u/cc	180	27%	73%	180-200	690	Diminished	8000	
7-2-45	12.15	"	110	" "	"	2.2 u/cc	200	53%	47%	100-180	680	0 "	10,000	
	17.00	"	130	" "	"	?	180	28%	72%	120-140	700	Normal	8000	
8-2-45	10.00	"	140	" "	"	0.06 u/cc	89	22%	78%	120-146	695	"	10,000	Intramuscular penicillin discontinued
	22.00	"	70	" "	"	0.24 u/cc	140	18%	82%	100	?	?	9,000	
9-2-45	10.00	"	120	" "	"	0.03 u/cc	220	37%	63%	120-140	700	Normal	10,000	
	23.00	"	100	" "	"	0.06 u/cc	300	54%	46%	140	690	"	10,000	
10-2-45	11.00	"	125	" "	"	0.015	120	50%	50%	100-120	?	?	10,000	
12-2-45	15.00	"	120	" "	"	Nil	38	0	100%	40-50	700	Normal	—	
20-2-45	10.30	"	155	" "	"	Nil	31	0	100%	35-40	700	"	—	

Fig. 4—Standard record of serial C.S.F. analyses, including penicillin assays, in an uncomplicated case of pneumococcal meningitis.

uninterrupted recovery which in the ensuing 15 months was shown to be complete.

No matter how urgent the case, the utmost precautions should be taken to ensure that penicillin for intrathecal injection should be free from contamination with insusceptible gram-negative organisms.

(2) FREE ACCESS OF ADEQUATE AMOUNTS OF PENICILLIN TO ALL PARTS OF THE CEREBROSPINAL PATHWAYS

The methods of treatment are conditioned by the fact that the meninges are relatively impermeable to penicillin, which must therefore be injected directly into the cerebrospinal fluid if adequate access of the drug to the seat of infection is to be achieved. After intravenous injection of 100,000 units in patients with normal or inflamed meninges we have found traces of penicillin in the cerebrospinal fluid, but never adequate concentrations. We have thus not been able to confirm the claim of Rosenberg and Sylvester (1944) that with 3-hourly systemic injections of 40,000 units curative amounts appear in the cerebrospinal fluid, and in fact one of our patients relapsed while receiving precisely this treatment (fig. 3). Systemic penicillin is of great value in treating the primary focus of infection, and also probably in the prevention and treatment of acute purulent arteritis of the cerebral vessels, a lesion which is found in many fatal cases, but we do not believe that it can cure the meningitis.

Dosage.—All the strains of pneumococci we have encountered, whether in the initial attack or in relapse, have been completely inhibited by penicillin in concentrations of 0·03–0·06 unit per c.cm. We accordingly aim at giving enough penicillin to maintain a somewhat higher concentration than this in the cerebrospinal fluid throughout the period between injections. Experience has shown that this is usually achieved by a single daily injection of from 3000 to 16,000 units. In our first cases, when the penicillin was very impure, and in large doses irritating, the usual range of dosage was from 3000 to 4000 units once daily, and in most cases this maintained an adequate concentration in the cerebrospinal fluid. With increasing experience we encountered some cases which relapsed and others in which penicillin was poorly retained, and as purer preparations became available we increased the dosage to from 8000 to 16,000 units once or twice a day without ill effect. We have never exceeded 20,000 units in any single lumbar or ventricular injection, nor is there any evidence that larger doses than this are necessary.§ Sweet and his colleagues (1945) gave as much as 40,000 units twice daily into the lumbar theca for several days. In their series the incidence of cauda equina reactions was high and the case-mortality was over 50%. There is no obvious correlation either in our series or in that of Sweet et al. between the size of the dose and the survival rate. In-vitro experiments do not suggest that there is any advantage in increasing the concentration of penicillin beyond the effective level, and Garrod (1945) found that impure samples of penicillin were actually more effective in low than in high concentrations. We have not lessened the incidence of relapse by increasing the dose.

There are a few cases in which, for one reason or another, penicillin disappears from the cerebrospinal fluid unusually rapidly (case 8), and for this reason the interval between doses should always be controlled by assay of the penicillin content of each sample of cerebrospinal fluid (fig. 4). Occasionally it is necessary to give penicillin two or even three times a day to maintain an adequate concentration; and in the initial stages of any severe case, before the results of the first assays are known, it may be advisable to repeat the intrathecal injection more often than once a day.

Route.—The term meningitis is in one respect a misnomer, for in the acute stage organisms are present not only in the subarachnoid space but also in the lateral ventricles, and in post-mortem specimens have been identified in the interstices of the choroid plexus. Our early cases, and a few of the later ones, were treated by intraventricular injections of penicillin, and pneumococci were grown from the ventricular fluid in 13 out of 18 cases. It is clear, therefore, that if it is to be effective penicillin must circulate freely throughout the subarachnoid space and the whole ventricular system.

§ Since writing this paper we have seen several patients who had been given 100,000 units intrathecally in a single dose. While some came to no harm there were two in whom the immediate sequel was occlusion of the lumbar subarachnoid space, and two others developed retention of urine and other signs of damage to the cauda equina. Johnson and Earl Walker (1945) report a case in which an intraventricular injection of 50,000 units caused a severe collapse followed by convulsions.

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Three routes of injection are available—the ventricular, the cisternal, and the lumbar. In the difficult relapsing case all three may be necessary. The ventricle tolerates penicillin as well as does the spinal theca, and this route is probably the most effective, but it requires surgical facilities, and, moreover, in the early days of the disease the lateral ventricles may be too small to hold an adequate volume of the solution. The cisternal route is difficult of access in the delirious patient with well-marked head-retraction; nor is it effective if the foramina of Magendie or Luschka or the aqueduct of Sylvius is blocked.

The lumbar route is the simplest and safest. That it could be effective was first shown by the recovery of penicillin from the lateral ventricle within 2 hours of a lumbar injection (Cairns et al. 1944). However, our initial attempts to treat patients by the lumbar route alone were unfortunate, since we lost 2 out of our first 4 cases. But since we have supplemented penicillin with sulphadiazine and have become aware of the signs and dangers of impending block we have successfully treated 17 cases by this method. Nevertheless, we still occasionally find it necessary to use the ventricular route (cases 4 and 8). The following case illustrates an important variant of pneumococcal meningitis in which cranial burr-holes are imperative.

CASE 4.—A soldier, aged 22, with acute frontal sinusitis, failed to respond to conservative measures; the infected sinus was opened and an extradural abscess discovered and drained. He developed pneumococcal leptomeningitis (type VII), and when parietal burr-holes were made for ventricular puncture it was unexpectedly found that he also had pneumococcal pus free in the right subdural space. This pus was drained and penicillin instilled into the subdural space through an indwelling catheter. His leptomeningitis was also treated. For some weeks he steadily improved, but later relapsed and died. Autopsy showed a localised subdural abscess to the right of the falx cerebri beyond the reach of the penicillin instillations.

If lumbar injections are to be effective it is essential that the cerebrospinal pathways are patent. These pathways may become blocked in several places and ways. The aqueduct may be blocked by pus, when there is a severe pyocephalus, and intraventricular injections through an indwelling catheter probably offer the best hope of controlling the infection. Secondly, the spread of penicillin in the cerebrospinal fluid may be prevented by the presence of an intracranial abscess; this is exceptional in pneumococcal meningitis, notwithstanding the occasional development of focal signs, as in case 3, and only 2 of our cases developed an abscess. Thirdly, the lumbar subarachnoid space may become occluded in cases of long-standing infections. In 3 of our patients who had had their meningitis for 3, 5, and 7 weeks respectively before treatment with penicillin was begun, all attempts at lumbar puncture resulted in dry taps, and one of these showed the clinical picture of a pure spinal meningitis by the time he was transferred to us. This is the type of block in which the cisternal route is useful, but we are fortunate in possessing full facilities for ventricular taps, and though we have used the cisternal route, both with needle and indwelling catheter, we prefer to give intraventricular injections when the lumbar route does not suffice.

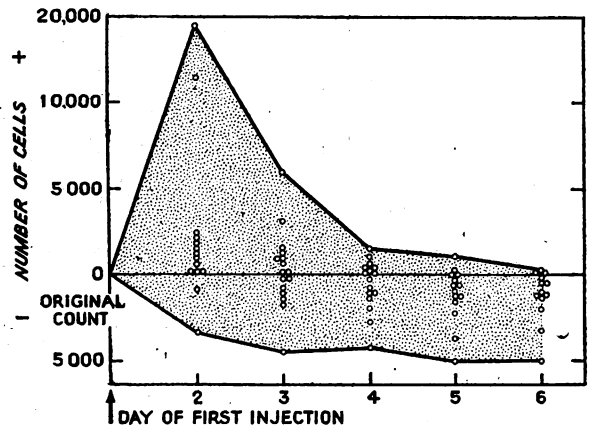

Fig. 5—The cellular response in 14 cases showing the rise and fall of cells, relative to the original count, during the first six days of treatment with intrathecal penicillin.

Finally, the subarachnoid space may become blocked in the early days of illness by the rapid deposition of thick, fibrinous pus. This is probably an earlier stage of the type of block just described, and it is very important because it renders lumbar injections completely useless. On the second or third day after the first injection of penicillin most patients show an increase in the cells in the cerebrospinal fluid (fig. 5) and many an increase in the protein (fig. 6). The cell-count usually doubles, but may even increase by tenfold; a corresponding rise in the protein content is rather less common. It is at this stage that there is most danger of the subarachnoid space becoming blocked, particularly in the case, exceptional in our experience, in which the initial cell-count of the cerebrospinal fluid is over 10,000 per c.mm. The crucial finding is that lumbar puncture becomes difficult: instead of running freely only small quantities of cerebrospinal fluid are obtained, nor can it be readily aspirated. This is an earlier sign of impending block than an abnormal Queckenstedt test and is an absolute indication for resorting promptly to one of the other routes, preferably the ventricular.‖ That the fluid obtained by lumbar puncture may be sterile and reasonably clear may be misleading, for these findings are quite compatible with a progressive meningitis higher up in the cerebrospinal pathways. Two of our fatal cases developed this type of block.

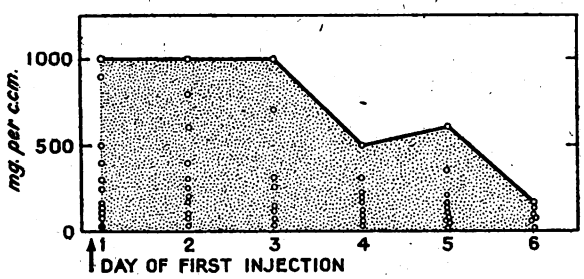

Fig. 6—The protein content of the C.S.F. in 11 cases during the first six days of treatment with intrathecal penicillin.

CASE 5 (R.I. 24155/45).—A man of 50 developed pneumococcal meningitis (type VIII) without definite evidence of a primary infection, and was treated by lumbar injections of penicillin. At first he improved considerably, but an attempt to withhold penicillin on the fifth day was promptly followed by clinical and bacteriological relapse. Injections were again begun by the lumbar, cisternal, and ventricular routes, and once again the lumbar fluid quickly became sterile. Nevertheless, he developed a block and died 2 days later.

Autopsy showed how misleading examination of the lumbar fluid can be. There was a thick green deposit of pus throughout the subarachnoid space except for the lowest 13 cm. of the spinal theca—that is, except for the site of the lumbar injections and the source of the sterile cerebrospinal fluid.

When a block is suspected penicillin should be injected at the time of the lumbar puncture, the ventricle tapped about 3 hours later, and the fluid obtained tested for penicillin. If this is present in reasonable quantities, all is well, since both cells and protein may be expected to fall within the next 24 hours. If no penicillin is recovered, ventricular injections should be continued for the next few days, and in any case an injection should be given at the first ventricular tap, following the withdrawal of fluid for analysis, because the results of the penicillin assay will not be available until the next day.

‖ Shalom (1945) has postulated that during lumbar puncture the cerebrospinal pathways may become blocked by herniation of the cerebellar tonsils through the foramen magnum, and to prevent this advocates that hypertonic solutions should be given systemically during intrathecal penicillin treatment. We have never encountered tonsillar herniation.

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(3) MAINTENANCE OF ADEQUATE CONCENTRATION OF PENICILLIN IN C.S.F. FOR A SUFFICIENT TIME

The indications for stopping treatment are hard to define. Even in the most straightforward case daily injections should be given for not less than five days, and should be withheld only when the patient is obviously approaching convalescence, when his temperature and pulse are normal, and when the cells and protein in the cerebrospinal fluid are falling steadily.

Relapse.—Relapses were common in our series: 3 patients died in relapse, and a further 9 had one or more relapses before they finally recovered, the maximum number of relapses in any one case being eight (fig. 3). In some cases relapse was due to reinfection of the meninges or to inadequate treatment; in others its cause remains obscure. The following 2 cases illustrate reinfection, in the one case from the primary focus, in the other from an intracranial fibrinopurulent collection.

CASE 6 (R.I. 5657/44).—A bricklayer, aged 53, developed pneumococcal meningitis (type III) after an incomplete mastoidectomy. The initial attack of meningitis was rapidly controlled by intrathecal penicillin and sulphadiazine, but 8 days after the penicillin was stopped there was a recrudescence of the meningitis, and cultures of the cerebrospinal fluid once more became positive. This second attack also responded well, and during convalescence the mastoidectomy wound was reopened. The original operation was found to have been incomplete. The dura of the middle fossa was exposed, and in one place a patch of granulation tissue was found from which pneumococci (of rough form) were cultured. After the second operation recovery was complete.

CASE 7.—A regular soldier, aged 39, had had chronic right-sided otitis media for 12 years which rendered him completely deaf in his right ear. In November, 1943, a radical mastoidectomy was performed, and three weeks later he developed pneumococcal meningitis (type III). He was treated with sulphathiazole and sulphapyridine (47 g. in 9 days) and responded well, but 4 weeks later relapsed: cultures of the cerebrospinal fluid were once more positive and he also had a positive blood-culture. Treatment with sulphapyridine was begun again, and again he rapidly recovered from the meningitis.

During this second attack he became increasingly restless and developed nystagmus, and although the meningitis rapidly subsided the restlessness increased until he became almost uncontrollable. At this stage he was transferred to Oxford.

On admission he was unconscious, but was violently and increasingly restless and at times vomiting. There were no focal signs in the central nervous system. Lumbar and ventricular punctures showed no signs of active meningitis, and ventriculography was normal except for a slight symmetrical dilatation. The uncontrollable restlessness persisted until a loculus of 30 c.cm. of cerebrospinal fluid in front of the cerebellum and pons was tapped at an exploratory operation for cerebellar abscess. He died a few hours after operation.

Necropsy showed a severe inhalation bronchopneumonia. Examination of the brain after fixation revealed a collection of pus within the sheath of the right auditory nerve, which entered the brain stem with the nerve and was continuous with a small abscess measuring 1·3 cm. × 0·5 cm. × 1·0 cm. at the apex of the right lateral recess of the fourth ventricle. There was no other evidence of intracranial infection except a thin layer of fibrinopurulent material measuring 0·5 × 0·3 cm. on the left side of the diaphragma sellæ. The collection of pus in the auditory nerve had no doubt formed as an extension of the chronic otitis and was the cause of his original attack of meningitis and of his subsequent relapse after apparent cure.

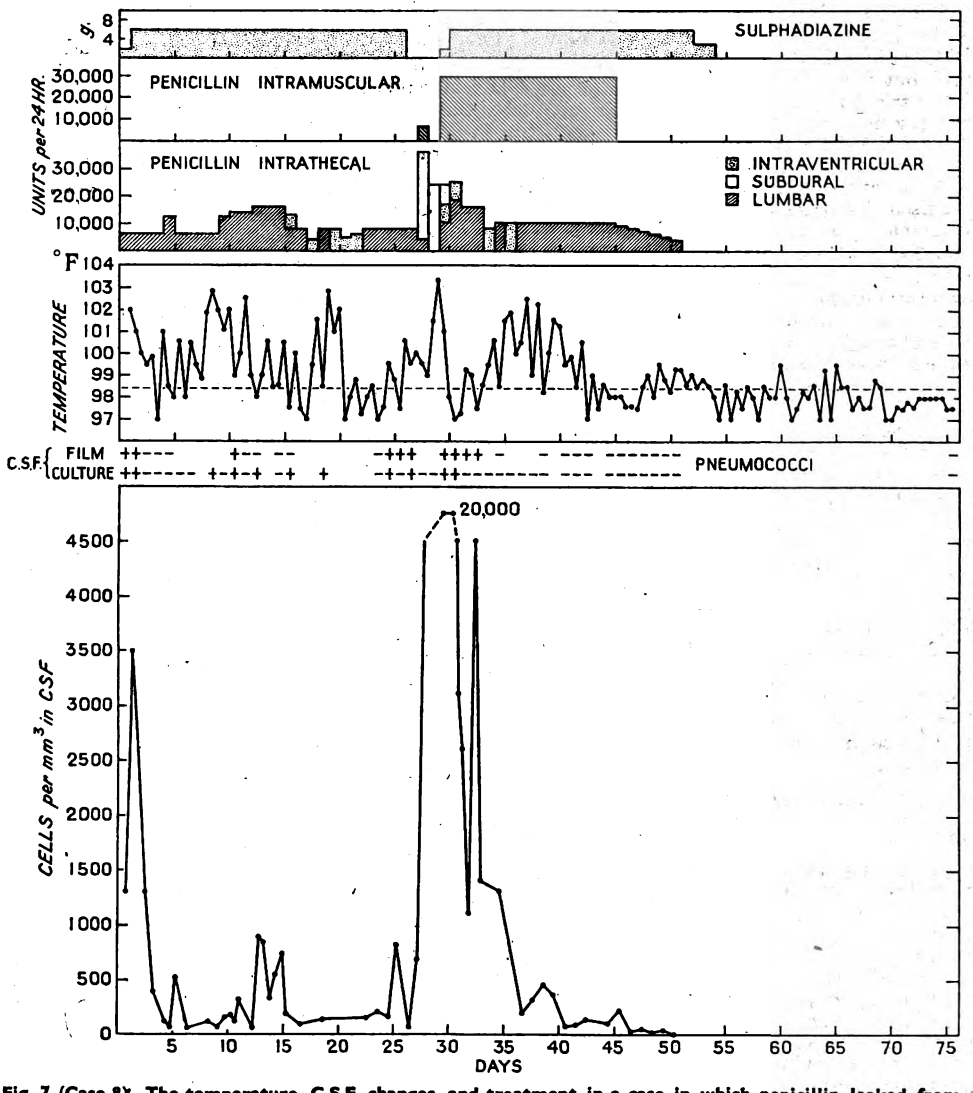

Fig. 7 (Case 8)—The temperature, C.S.F. changes, and treatment in a case in which penicillin leaked from the subarachnoid space through a subdural hydroma.

The small abscess in the auditory nerve and lateral recess explains the relapse of meningitis in this case. In the relapsing cases where no extracranial cause of reinfection or coarse intracranial focus was present (fig. 3) we have assumed that the cause of the relapses was some small purulent lesion like that of case 7. From the chemotherapeutic point of view such lesions resemble the vegetations of subacute bacterial endocarditis. Penicillin cannot penetrate to their interior. The treatment of such cases is extremely trying. The patient finds the apparently endless succession of lumbar punctures almost intolerable, while the medical and nursing staff becomes disheartened by the repeated disappointments. And yet recovery, in most cases complete and permanent,

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can finally be achieved if each relapse is treated with the same thoroughness as the initial attack.

Treatment can be inadequate because it is withdrawn too soon; because the preparation of penicillin in use has deteriorated; or because the theca is abnormally permeable to penicillin and a steady concentration is not maintained in the cerebrospinal fluid.

CASE 8. *Pneumococcal meningitis. Rapid escape of penicillin from cerebrospinal fluid into subdural hydroma* (fig. 7). (R.I. 27332/44.)—A child of 18 months developed rhinorrhœa after a comparatively mild head injury although repeated X-ray examinations showed no fracture. This ceased permanently after 5 weeks, but about the same time she developed obvious signs of meningitis. Lumbar puncture gave cloudy fluid containing pneumococci (type XIX). Treatment by sulphadiazine and daily lumbar injections of penicillin was begun, and the fluid became sterile within 24 hours. Six days later the cerebrospinal fluid contained only 55 cells per c.cm., of which 38 were lymphocytes; the protein, sugar, and chloride content were all normal. The only disquieting features were a persistent pyrexia with a rising pulse-rate and the fact that no penicillin could be recovered from the cerebrospinal fluid 12 hours after injection.

On the seventh day the lumbar injection of penicillin was omitted, and on the eighth pneumococci reappeared in the fluid. It was obvious that she was losing penicillin from the theca at an abnormally rapid rate, and accordingly 12-hourly, and later 8-hourly, lumbar injections were given; but even so cultures of the cerebrospinal fluid remained positive and no penicillin could be recovered.

After another 7 days resort was had to the ventricular route. Five hours after a lumbar injection of 8000 units of penicillin bifrontal burr-holes were made. To our surprise a large subdural collection of yellow fluid was found over the right hemisphere. This was sterile, but contained 0·5 unit of penicillin per c.cm., while the ventricular fluid contained 1·0 unit per c.cm. She was receiving no systemic penicillin at this time. An intraventricular injection of 5000 units was then given, and five minutes later another sample of the subdural fluid collected. Penicillin assay showed that even in this short time the content had risen to 5·0 units per c.cm. It seemed that here was the explanation of the abnormal permeability of the theca: the subdural collection was acting as a large leak in the pia arachnoid.

After this procedure there was some improvement, but this was not sustained; cultures of the cerebrospinal fluid again became positive, and the abnormally rapid disappearance of penicillin from the cerebrospinal fluid continued.

During the next week the following observations were made:

(1) The penicillin content of the urine was estimated 6 and 9 hours after intrathecal injection of 8000 units of penicillin. High values (20 and 7 units respectively) were obtained, showing that excretion from the theca was rapid.

(2) The penicillin content of the cerebrospinal fluid was estimated before and after an intramuscular injection of 30,000 units of penicillin. No significant difference was detected.

(3) After the injection of 8000 units of penicillin into the subdural space none appeared in the cerebrospinal fluid, while a blood level of 0·1 unit per c.cm. was maintained for several hours.

(4) During a period of 24 hours in which subdural penicillin was given every 6 hours but intrathecal injections withheld there was a rapid increase in the number of organisms in the cerebrospinal fluid.

Thus, in this case we have evidence that penicillin passed rapidly from the cerebrospinal fluid to the subdural space, but not in the reverse direction; that there was rapid passage of penicillin from both the cerebrospinal fluid and the subdural space to the blood, but not from the blood to the cerebrospinal fluid; and that the rapid disappearance of penicillin was due to its passage through the subdural space into the blood-stream.

The subdural collection was treated by catheter drainage and instillation of penicillin. As the subdural space became obliterated, so the period of retention of penicillin in the cerebrospinal fluid increased from less than 8 to 24 hours. Once good levels could be maintained recovery was rapid and complete.

In 2 cases single positive cultures were obtained from the cerebrospinal fluid when convalescence was far advanced, and without any concomitant clinical disturbance or cellular reaction in the cerebrospinal fluid. These may be termed subclinical relapses.

The frequency of relapse emphasises the need for careful and prolonged observation of every case until the cerebrospinal fluid is entirely normal. Relapse is heralded by a rise in the temperature and pulse-rate which often predates reappearance of organisms in the cerebrospinal fluid by 24 hours.

(4) TREATMENT OF THE PRIMARY FOCUS

The commonest site of the primary infection is in the ears or nasal sinuses. Such infections can usually be satisfactorily controlled by intramuscular injections of penicillin, while they are relatively resistant to sulphonamides. The response to penicillin has been so good that our otological colleagues have never found any need to operate during the acute phase, and often by the time the meningitis is cured not only the clinical picture but the X-ray appearance of the nasal sinuses or mastoids has returned to normal, though in cases secondary to a chronic otitis subsequent mastoidectomy may be required (case 6).

In our series pneumococcal meningitis followed head injury in 5 cases. There was a fracture into the paranasal sinuses and a tear of the overlying dura, and the interval between injury and the onset of meningitis varied between 1 day and 5 years. There are many surgical problems connected with these cases which cannot be discussed in this paper, but, in general, as soon as the patient has completely recovered from his meningitis the anterior fossa should be exposed and the dural tear closed by graft (e.g., fascia lata) or other means. It is better practice to operate before the patient gets meningitis.

Dangers of Intrathecal Treatment with Penicillin

Even when treatment is both early and adequate the results may be disappointing if the risks inherent in giving injections into the cerebrospinal fluid are not heeded.

(1) The preparation used should be suitable for intrathecal use. Some preparations are intensely irritating and capable in themselves of causing a brisk sterile meningitis. Supplies of a non-irritating preparation should be set aside for the treatment of meningitis. All our recent work has been done with Pfizer penicillin (approximately 500 to 700 units per mg.).

(2) Excessive dosage (40,000 units and over at a single injection) may produce fits (Johnson and Walker 1945) or other severe cerebral reactions (Cairns et al. 1944) when injected into the ventricles, or damage to the cauda equina or gumming of the subarachnoid space when injected by the lumbar route.

(3) There is a very definite risk of introducing secondary infection. Either the technique of lumbar puncture may be faulty or the penicillin solution may become contaminated with resistant organisms. Although our lumbar punctures have all been done with a standard non-touch technique, using dry sterilised instruments, on no less than eleven occasions have organisms other than pneumococci been grown during treatment from samples of cerebrospinal fluid.

Staphylococcus aureus appeared 3 times, *E. coli*, a non-hæmolytic streptococcus, and *Proteus morgani* once each, all without clinical symptoms. The other organisms were non-pathogenic. Each infection was only grown from one sample, except the *Proteus morgani*, which appeared in the cerebrospinal fluid obtained on three consecutive punctures.

No cellular reaction was detected, except in one case. The chance of introducing infection is enormously increased by the large number of injections which may be necessary. One of our relapsing cases received no fewer than 95 intrathecal injections (fig. 3), and another 70 before the meningitis was finally cured. The most serious secondary infection is that due to *Ps. pyocyanea*. Botterell and Magner (1945) reported 11 cases of *Ps. pyocyanea* meningitis complicating the combined

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local and intrathecal penicillin treatment of brain wounds, with 9 fatalities. In 2 of these cases the infection was thought to have been introduced by the intrathecal injection of contaminated penicillin. In the same journal is the report of 2 fatal cases of *Ps. pyocyanea* meningitis following spinal anæsthesia (Evans 1944). These reports in themselves are sufficient to emphasise the hazards of repeated intrathecal injections. Penicillin treatment of meningitis should not be undertaken without the highest standards of asepsis in lumbar punctures.

(4) There is the risk involved in doing numerous lumbar punctures on a patient with high intracranial tension. Probably this danger is negligible except when the meningitis is complicated by an intracranial abscess, when it is considerable.

Technical Methods

Preparation of penicillin solutions.—The penicillin is dissolved in pyrogen-free saline to a concentration of 2000 units per c.cm., and after Seitz filtration distributed in 8 c.cm. amounts in small sterile screw-capped bottles and stored in the cold. The loss is about 5–10% weekly, depending on the samples. Since rigorous precautions are taken nowadays to exclude contamination by bacteria in all the penicillin marketed and we have been unable to detect any contaminated samples, it is quite likely that Seitz filtration is no longer necessary.

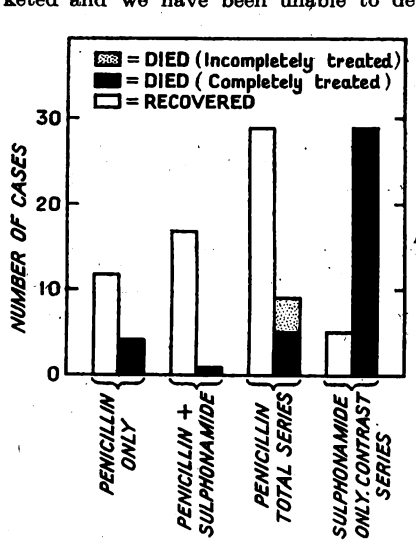

Fig. 8—Results of treatment with penicillin, alone and combined with sulphonamides, in a series of 38 cases. The results in a contrast series of 35 cases treated with sulphonamides alone is included.

Culture methods.—*Para*-aminobenzoic acid to about 1/20,000 is added to the specimen of cerebrospinal fluid and the centrifuged deposit is spread on penicillinase blood-agar plates and inoculated into the penicillinase-containing serum broth (Duthie 1944).

Penicillin estimations.—Since the concentration of penicillin in a sample of spinal fluid may vary from nothing to at least 5 units per c.cm., it is convenient to assay the specimens by at least two of the following methods. In all cases receiving sulphonamides, *para*-aminobenzoic acid must be included either in the fluid or in the medium with which the fluid is to be diluted.

(1) For specimens likely to contain more than 0·5 unit per c.cm. the specimen can be diluted with sterile neutral phosphate buffer and estimated on seeded staphylococcal plates, using the ring method described by Heatley (1944).

(2) For specimens containing between 0·1 and 0·5 unit per c.cm. the undiluted specimen can be placed in a ring on similar plates, but seeded with a more dilute staphylococcal suspension, 1/1000 of an 18-hour culture.

(3) For specimens containing between 0·025 and 0·1 unit per c.cm. the slide-cell method used by Heatley (1944) is sufficient. Since CO_2 is given off by the cerebrospinal fluid when removed from the body, increasing the alkalinity to about pH 8·6, it is best to add a small part of neutral serum to the first dilution and to dilute in serum in the subsequent dilutions. This makes for better growth of the test staphylococcal organisms, as well as keeping the pH within the range in which penicillin is not inactivated. Accurate estimations may require that the specimen of fluid be estimated on two successive days. Little loss will occur at 4° C, while the loss at 37° C is about 40% in 24 hours.

Results

Since March, 1943, we have treated in all 38 cases, with 9 deaths (fig. 8). These cases fall into two main groups:

(1) 19 patients treated with penicillin alone;
(2) 19 patients treated with both penicillin and sulphadiazine.

In the first group there were 7 deaths. In 3 the patient was moribund when admitted to hospital and died within the next few hours. Of the fully-treated patients 2 died from intracranial abscess, while in the remaining 2 the initial response was good, but subarachnoid block developed with subsequent relapse and death. In one of these, intrathecal penicillin injections had been stopped too soon.

In the second group one patient died from fat-embolism and one other died within 12 hours of admission to hospital.

In 2 of the 29 survivors recovery has been incomplete. One was a child of 18 months who had had meningitis for 4 weeks before intrathecal penicillin was given; by this time she had developed a severe posterior basic syndrome, and although ultimately all signs of active infection disappeared and the hydrodynamics of the cerebrospinal fluid returned to normal she was left with gross generalised spasticity. The second was a woman of 45 who had developed a severe bilateral nerve deafness by the time treatment with penicillin was begun. In one case complications threatening complete recovery developed during treatment: at the end of a stormy illness in which recovery had been interrupted by no fewer than 8 relapses (fig. 3), the patient, a boy of 12 years, developed a severe parkinsonian syndrome; six weeks after the meningitis finally cleared up, the boy began to improve, and twelve weeks later returned to school, where he soon showed that his recovery was complete.

In 27 cases observed for up to two years, mental and physical recovery was complete, though in one case it is known and in others suspected that ventricular dilatation was present at the time of discharge from hospital. Most patients noticed some increasing tendency to fatigue for the first 2–3 months after they resumed their normal life, but this was all. There have been no postmeningitic fits or headaches. The following are examples of the degree of recovery which should be expected. Two children who were 18 months old at the time of their illness were, 18 months later, perfectly healthy and developing normally. A boy of 15 years (case 3) returned to school 2 months after his illness; there was no loss of ability in work or games. A foreman-inspector of an aircraft factory went back to full-time work which he performed with all his old efficiency; and the pilot of a Lancaster bomber returned to full operational duties.

Discussion

A study of the 9 fatal cases gives a guide to prognosis and illustrates some of the reasons why treatment may fail.

Cause of death	*No. of cases*
Delay in treatment	4
Spinal block	1
Early cessation of treatment and spinal block	1
Cerebral abscess and aqueduct block	1
Subdural abscess	1
Unrelated to meningitis	1
TOTAL	9

The most important factor is delay in instituting effective treatment, for if the infection has been allowed to progress beyond a certain stage all treatment becomes useless. The time when this irreversible state is reached depends on the severity of the infection and in fulminating cases is a few hours only.

The formation of a subarachnoid block does not necessarily carry a bad prognosis, provided its presence is recognised and intraventricular treatment promptly begun. Gross intracranial abscess is fortunately a rare accompaniment of pneumococcal meningitis and undoubtedly alters the prognosis for the worse. Two of our patients had signs suggestive of cerebral thrombo-

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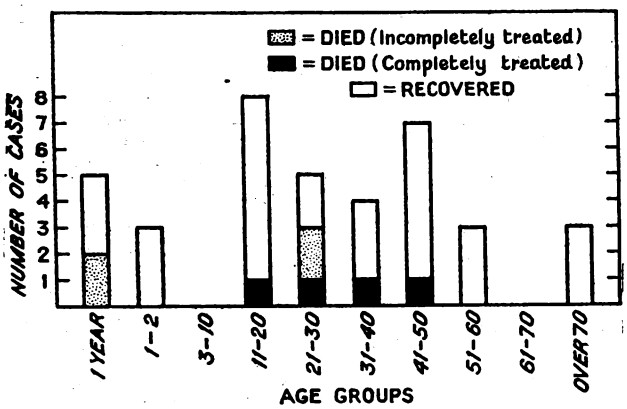

Fig. 9—Recoveries and deaths from meningitis according to age-groups. The two infants who died were moribund when treatment was begun.

phlebitis, and two of venous sinus thrombosis. In the two former abscess was excluded by ventricular estimation or ventriculography. All received their intrathecal penicillin by the lumbar route and made an uninterrupted recovery.

Relapses, which are unfortunately common, differ in no essential particular from the initial attack. The prognosis is good if promptly recognised and energetically treated.

We have found no other factor of prognostic significance. Sweet and his colleagues (1945) and Appelbaum and Nelson (1945) suggest that the prognosis is worst at the extremes of life. Our results do not confirm this (fig. 9). Nor is the outcome necessarily affected by the site of the primary focus, the presence of organisms in the blood-stream, or the cellular and bacteriological content of the cerebrospinal fluid at the time when treatment is begun. In many of our successful cases the cerebrospinal fluid was swarming with organisms, while the cell-count was comparatively low; in fact, the turbidity of the fluid was chiefly due to the huge number of bacteria. We have found no predominance of any one type of pneumococcus, nor is there any correlation between the type and the clinical picture. We therefore conclude that if both chemotherapy and general nursing care be adequate every patient should recover from pneumococcal meningitis, provided his case be taken in time.

Summary

Thirty-eight cases of pneumococcal meningitis were treated with penicillin. Of these, 4 were moribund on admission. Of the 34 fully-treated cases 5 died—2 from meningitis, 2 from intracranial abscess (one with ventriculitis), and 1 from unrelated causes (fat-embolism). The last 18 fully-treated cases received both penicillin and sulphadiazine and all these patients recovered from their meningitis. In 27 cases recovery was complete.

The principles and practice of treatment are discussed. As a routine of treatment we recommend intrathecal and systemic penicillin, with sulphadiazine by mouth. We have no evidence that systemic penicillin alone can cure meningitis. Intrathecal treatment with penicillin carries certain risks, and the importance of strict asepsis is paramount.

Technical methods for preparing penicillin solutions and for penicillin estimation in cerebrospinal fluid are briefly described.

All 34 fully-treated cases responded promptly to intrathecal penicillin, but 12 subsequently relapsed, the number of relapses varying from one to eight. The causes of relapse are discussed, and the importance of maintaining an effective concentration of penicillin in the cerebrospinal fluid throughout the periods between injections is emphasised. In some patients penicillin disappears abnormally rapidly from the cerebrospinal fluid. In one such case this was caused by a subdural hydroma which acted as a leak in the leptomeninges.

It is important that regular assays of penicillin in the cerebrospinal fluid be done in order to provide a check on dosage and to detect any abnormal rate of excretion.

Consideration of the fatal cases shows that early diagnosis and prompt institution of treatment are the chief factors in prognosis.

We wish to thank Dr. W. J. D. Fleming and Dr. B. Moore for the bacteriological examinations and the later penicillin assays; Mr. R. G. Macbeth and Mr. G. Livingston of the E.N.T. department of the Radcliffe Infirmary; Dr. Leonard Findlay and Prof. Arthur Ellis for permission to treat their cases; Mr. David Gall for help with the charts. Penicillin was supplied by the Clinical Trials Committee of the Medical Research Council.

REFERENCES

Alexander, H. E., Ellis, C. (1942) *J. Pediat.* **20**, 673.
Appelbaum, E., Nelson, J. (1945) *J. Amer. med. Ass.* **128**, 778.
Bloomfield, A. L., Kirby, W. M. M., Armstrong, C. D. (1944) *Ibid*, **126**, 685.
Botterell, E. H., Magner, D. (1945) *Lancet*, i, 112.
Cairns, H., Duthie, E. S., Lewin, W. S., Smith, H. V. (1944) *Ibid*, i, 655.
Duthie, E. S. (1944) *Brit. J. exp. Path.* **25**, 96.
Evans, F. T. (1944) *Lancet*, i, 115.
Fleming, A. (1943) *Ibid*, ii, 434.
Florey, M. E., Florey, H. W. (1943) *Ibid*, i, 387.
Garrod, L. P. (1945) *Brit. med. J.* i, 107.
Heatley, N. E. (1944) *Biochem. J.* **38**, 61.
Johnson, H. C., Walker, E. A. (1945) *J. Amer. med. Ass.* **127**, 217.
Rosenberg, D. H., Sylvester, J. C. (1944) *Science*, **100**, 132.
Shalom, E. S. (1945) *Lancet*, ii, 36.
Sweet, L. K., Dumoff-Stanley, E., Dowling, H. F., Lepper, M. H. (1945) *J. Amer. med. Ass.* **127**, 263.
Ungar, J. (1943) *Nature, Lond.* **152**, 245.
Waring, A., Smith, M. (1944) *J. Amer. med. Ass.* **126**, 418.

TUBERCLE BACILLI IN THE PLEURAL EFFUSION OF YOUNG ADULTS

H. G. CLOSE
M.D. Lond.
PATHOLOGIST, E.M.S.
From the Southern Hospital, Dartford

DURING the past four years 159 young adults have been treated in this hospital for pleural effusion not due to heart, liver, or kidney disease. The majority (70%) were sailors from a Royal Naval hospital; the remainder were civilians, soldiers, and female Service patients in almost equal numbers. The ratio of males to females was 9 to 1. The age-distribution of the whole group was as follows:

Age (years)	*No. of cases*
16–25	129 (*81*%)
26–35	19
36–45	11

Before the onset of the pleural effusion these patients had been in good health and on full duty, and at the time of admission to this hospital the cause of the effusion had not been diagnosed. The onset of the illness was usually marked by fever, malaise, and pain in the chest, but in a few instances the onset was insidious and the patients did not report sick. For example, effusion was discovered in 16 patients during a routine mass radiographic examination. (Seven of these were found later to have tubercle bacilli in pleural fluid or sputum.)

The clinical diagnoses among the 159 patients were as follows:

Diagnosis	*No. of cases*
Tuberculosis	133 (*83*%)
Postpneumonia	21
Trauma	3
Not known	2

That such a high proportion (83%) of pleural effusions should have been diagnosed as tuberculous is not surprising, as it is generally agreed that tuberculosis is the commonest cause of pleural effusion in young adults. What is surprising, however, is that this widely held belief appears to have been founded upon inadequate evidence. For example, reports of the follow-up of many young adults who have had pleural effusion show the tuberculosis morbidity-rate to be only about 40% (Robson 1944), a figure well below the 83% diagnosed as tuberculous on clinical grounds. Also, there are few

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published reports of laboratory findings in pleural effusions of young adults, and no indication of the proportion of fluids proved to be tuberculous. The evidence, however, need no longer be considered inadequate. As shown below, results have been obtained which uphold the belief that almost all these effusions are tuberculous in origin.

Pleural fluids were examined from 102 of the 159 patients. The 57 patients whose fluids were not examined here had had a diagnostic aspiration at the naval hospital, and a second aspiration was not thought to be necessary.

ROUTINE FINDINGS

Almost all the fluids examined were alike: straw- or amber-coloured; slightly hazy with filmy clot; 3–6% of protein; 100–10,000 white cells per c.mm., most of which were lymphocytes. And not even in the minor variations did there appear to be any correlation with the presence or absence of tubercle bacilli.

Among the fluids of the 102 patients there were 4 exceptions to the straw-coloured appearance: 1 patient had the milky fluid of a cholesterol effusion, and 3 had bloody effusions not due to trauma or faulty technique in aspiration. The latter 3 patients were over 30 years of age and showed no evidence of tuberculous infection or of carcinoma of the bronchus. Two gave a history of recurrent attacks of pneumonia for at least five years; the third had generalised dermatitis. The fluids were also similar in that they did not clot and had an unusually large number of eosinophils (15–30% of the white cells). They thus resembled the fluids obtained from patients with hæmothorax due to wounds of the lung (Gregoire and Courcoux 1919).

Though lymphocytes formed over 90% of the white cells of most of the fluids, a proportion of polymorphs higher than 10% was occasionally found. Only one patient had a high percentage of endothelial cells (35%) in the pleural fluid; his effusion followed an attack of bronchopneumonia.

TABLE I—PROPORTION OF PATIENTS WITH PLEURAL EFFUSION FOUND TO CONTAIN TUBERCLE BACILLI DURING THE YEARS 1941–45

Year	Patients with T.B.-positive fluid	Patients whose pleural fluid was examined	% T.B.-positive
1941	Nil	11	Nil
1942	Nil	17	Nil
1943	6	27	22
1944	12	24	50
1945	16	23	70

TUBERCLE BACILLI IN PLEURAL FLUIDS

During the period of this investigation (four years) tubercle bacilli were found in the pleural fluid or sputum of 40% of the patients with pleural effusion (table III). But with improvement in the technique of investigating the fluids, the proportion of T.B.-positive effusions in the past year has risen to 70%. Hence there is now fair agreement between the number of tuberculous patients diagnosed at the bedside and the number diagnosed in the laboratory—e.g.,

By clinical diagnosis 83%
By laboratory findings .. .. 70% (table II)
By follow-up .. .. .. 40% (Robson 1944)

Table I shows the increase in the number of fluids found to be tuberculous as a result of improvement in technique.

During 1941 and 1942 no growth of tubercle bacilli followed when 1–2 c.cm. of pleural fluid was used for cultivation. In 1943 tubercle bacilli were found growing in a piece of clot which had been inadvertently placed on the medium. Thereafter, as more clots and centrifuged deposits per specimen were sown, more T.B.-positive cultures were obtained. For the past year the following procedure has been used whenever possible:

About 100 c.cm. or more of fluid is aspirated, and about three-quarters is put into empty small screw-capped bottles—e.g., the L.C.C. "bijou" (15 c.cm.) bottle—in amounts of about 10 c.cm. In this way small clots are obtained (these can best be manipulated with a straight wire). The remainder of the fluid is put into bottles containing a few drops of 20% sodium citrate (2 drops to 10 c.cm. of fluid), which prevents clotting. These citrated fluids are used for different examinations—e.g., white-cell count and protein content; the centrifuged deposit for the differential cell-count (smears being made and stained as for blood-counts), for smears stained by Gram's and Ziehl-Neelsen's method; and for culturing on nutrient agar and Lowenstein-Jensen's medium; and for injections into guineapigs.

Some of the deposit and a clot or two are planted directly onto Lowenstein-Jensen's medium in spite of the risk of contamination; but most of the deposit and clots are treated first with acid—e.g., 1% HCl or 2% H_2SO_4 (about a third of the strength of acid used for sterilising suspected tuberculous sputum)—and are then washed in physiological saline. If a stronger acid is used, the clot becomes hard and horny.

It is not known yet which of these methods of culturing is the best; but, if a preference had to be shown, the clot-with-acid method would be chosen. Success in recovering tubercle bacilli from pleural fluids probably depends more on the sowing of many clots, or much deposit, than on the method of preparing them for sowing. In 9 of 18 recent T.B.-positive fluids tubercle bacilli were grown in only one of ten or more culture tubes, and it is improbable that their presence would have been disclosed if the earlier practice of sowing a few clots, or a small amount of deposit, had been followed.

An increase in the number of sowings, however, has the drawback of taking up time, which may be ill spared in a busy laboratory. The sowings need not, however, be made at one time or immediately after aspiration of the fluid. Tubercle bacilli do not die quickly and have been found capable of growing from fluid aspirated fourteen days before.

It may not always be possible to get so much fluid as is suggested above, but no opportunity for culturing should be neglected. Even 1–2 c.cm. of what looks like blood from an unsuccessful attempt at aspiration should be put on culture medium. From three such lung punctures growths of tubercle bacilli have been obtained.

Most of the T.B.-positive cultures (14 of the 18) were obtained from fluid taken at the first aspiration. A few (3 of the 18) were obtained at the second aspiration, and one at the sixth, after a secondary streptococcal infection had been quelled.

Tubercle bacilli were grown from fluids which had been in the pleural cavity for various lengths of time: the youngest was one week old; the oldest, twenty-eight weeks.

TABLE II—COMPARISON OF THE RESULTS OBTAINED BY CULTURAL AND GUINEAPIG TESTS

Patients examined	T.B.-positive fluids	Culture + Guineapig +	Culture + Guineapig −	Culture − Guineapig +
102	34	10	24	0

+ = T.B.-positive − = T.B.-negative

COMPARISON OF CULTURAL AND GUINEAPIG METHODS FOR FINDING TUBERCLE BACILLI

The results obtained by the two methods of recovering tubercle bacilli from pleural fluids have been compared and are shown in table II. Tubercle bacilli were grown on culture medium from every fluid that was T.B.-positive; and not a single guineapig test was T.B.-positive when the corresponding culture was T.B.-negative. The Lowenstein-Jensen medium, however, is still thought by some to be less reliable than the guineapig test. For

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example, Gloyne (1939), using 1–2 c.cm. of fluid for culturing and 10 c.cm. for the guineapig test, believes that the guineapig is the more sensitive means of detecting tubercle bacilli in pleural fluids. When Gloyne's ratio of 1 to 10 is reversed, and clots and deposits from more than 100 c.cm. are used for culturing and 10 c.cm. for the guineapig test, the culture medium becomes more effective than the guineapig (table II).

When it was seen that the cultures were giving more T.B.-positive results than were the guineapigs, the guineapigs and the technique of injection were subjected to a test. Guineapigs were also injected at a second laboratory, but the results here were no better than in the first laboratory. In 16 such duplicate tests each laboratory reported only two T.B.-positive guineapig results, though from 12 of these 16 fluids tubercle bacilli had been grown.

It is plain, therefore, that in the examination of pleural fluids the guineapig is less reliable than the culture medium in revealing tubercle bacilli, and that the value hitherto placed on the guineapig test is in need of revision.

TUBERCLE BACILLI IN THE SPUTUM OF PATIENTS WITH PLEURAL EFFUSION

At least three specimens of sputum or of gastric washings were examined for tubercle bacilli from every patient with pleural effusion. Table III shows that tubercle bacilli were found in the sputum of 14 patients: 8 of these had tubercle bacilli also in the pleural fluid, and the other 6 no tubercle bacilli in the fluid; 26 patients had tubercle bacilli in their pleural fluid but not in their sputum.

TABLE III—INCIDENCE OF TUBERCLE BACILLI IN PLEURAL FLUIDS AND SPUTA OF 102 PATIENTS

Findings	No. of cases
T.B.-positive pleural fluids with T.B.-positive sputa	8
T.B.-positive pleural fluids with T.B.-negative sputa	26
T.B.-positive pleural fluids	34
T.B.-negative pleural fluids with T.B.-positive sputa	6
Total T.B.-positive patients	40
Total no. of patients examined	102

COMBINED FINDINGS

During the first eight months of 1945, pleural fluids from 23 young adults were examined.: 20 of these were suspected, on clinical grounds, of being tuberculous. Of the remaining 3, 1 patient had a staphylococcal empyema and 2 had effusions following pneumonia.

Tubercle bacilli were found in the pleural fluids of 16 of these patients and in the sputum only of 2 patients.

Thus laboratory methods confirmed the presence of tuberculous infection in 18 of 20 patients whose pleural effusions were diagnosed clinically as being of tuberculous origin.

SUMMARY

An increase in the number of clots and in the amount of centrifuged deposit from pleural fluids sown on Lowenstein-Jensen's medium brought about an increase in the number of effusions in which tubercle bacilli could be demonstrated.

There is now evidence to substantiate the belief that most pleural effusions of young adults are tuberculous in origin. Tubercle bacilli were found in the pleural fluid or sputum of 90% of young adults with a pleural effusion diagnosed clinically as tuberculous.

The culture medium was more effective than the guineapig in revealing the presence of tubercle bacilli in pleural fluids.

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CRITERIA OF EOSINOPHILIA

GEORGE DISCOMBE
M.B., B.Sc. Lond.
SENIOR DEMONSTRATOR OF PATHOLOGY, ST. BARTHOLOMEW'S HOSPITAL; PATHOLOGIST E.M.S.

IN selecting a method for any quantitative determination it is usually possible to find one which is, in theory, inherently less inaccurate than others, though difficulties of manipulation, speed, &c., may render it impracticable. The methods of selection are well known in the physical and chemical fields (cf. Treadwell and Hall 1924), but in biology and medicine, where enumerations are the rule, a statistical approach is necessary, and this has delayed the application of the theory of intruments to such problems as blood-counts.

Recently it became necessary to determine with a considerable degree of accuracy the eosinophil count of a series of patients, while our limited staff was unable to undertake the large number of differential counts required. The literature showed that methods for counting eosinophils in a hæmocytometer have in the past been devised, and that in theory a hæmocytometric method could be far more accurate than any differential count besides being much less laborious. The simplest of these methods, Dunger's (1910), was chosen and slightly modified; with it the normal range was estimated from observations on 60 healthy adults, equally divided between the sexes, drawn from students, nurses, and laboratory staff. The observations were further analysed to make sure that the distribution of cells in the counting chambers agreed with that expected theoretically, because, if this proviso is not satisfied, no reliance whatever can be placed on the results obtained. Before describing the method it appears desirable to outline the considerations on which the choice of the hæmocytometric method was made.

If a series of differential counts is performed on a specimen of blood, each count sorting N cells into two classes, P and Q, the proportions of which are p and q = 1-p, then the frequency with which 0, 1, 2, 3, . . ., n cells of class P will be found in the result is given by the successive terms of the expansion of the binomial $(q + p)^N$. The implications of this statement have been discussed before, notably by Goldner and Mann (1938), assuming that the cells of the stained film are distributed at random, an assumption which is not true for smears made on slides (MacGregor et al. 1940) but which appears to be true for cover-slip films (Barnett 1933).

If p is less than 0·1 or 10%, the chances of obtaining a result closely approximating to the true value is small, unless the number of cells classified is very large. For example, if p = 0·03 or 3% and N = 200, the correct result will be obtained in only 16·3% of counts, and results over 1·5% and under 5% will occur only in 77% of counts, while 14·7% of counts give results of 1·5% or less, and 8·24% results of 5% or more. It is obvious, therefore, that increases in the proportion or absolute number of cells present to the extent of 1–5% in blood can be detected with certainty by a differential count only if very large numbers of cells are counted in cover-slip preparations.

The uncertainty of hæmocytometer counts, however, varies with the square root of the number of cells counted

DR. CLOSE: TUBERCLE BACILLI (*continued*)

I am grateful for help from Dr. A. Kahan and other colleagues at this hospital; Major J. E. MacCartney and Dr. E. N. Allott of the L.C.C. pathological service, and Dr. Roberta Hutchinson of the E.P.H. laboratory service.

REFERENCES

Gloyne, S. R. (1939) *Post-grad. med. J.* **15**, 399.
Gregoire, N., Courcoux, A. (1919) Wounds of the Pleura and of the Lung, London.
Robson, K. (1944) *Practitioner*, **153**, 344.

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(Abbé 1878, Lyon and Thoma 1881, Student 1907, Bryan et al. 1935); hence it can be made as small as is wished by counting more cells.

METHOD

Blood is diluted 1 in 20 with the fluid (1% aqueous eosin Y and acetone 5 vols. each; distilled water to 100 vols.), which keeps some weeks, and after mixing allowed to stand 5 min. After the pipette has been shaken vigorously by hand for 2–3 min., a Fuchs-Rosenthal chamber is filled; and, when the cells have settled (1–2 min.), the preparation is examined with a ⅔ in. objective and a ×10 eye-piece under the most brilliant illumination tolerable. Under these conditions unstained leucocytes cannot be seen at all, and the stained eosinophils appear as deep red particles and can easily be counted; in case of doubt one may examine individual cells with the ⅛ in. objective. With this technique there can be no confusion between eosinophils and other cells, as was suggested by Galambos (1910). Clumping is unusual; if it develops, the preparation must be rejected.

The sixty volunteers, mostly aged 20–25 years, denied any allergic manifestations and had been free from even the slightest infection for at least eight weeks. From each subject 4–6 pipettes were filled from the ear, two Fuchs-Rosenthal chambers were filled from each pipette, and 100 large squares (= 20 c.mm. diluted or 1 c.mm. undiluted blood) examined. The number of squares containing 0, 1, 2, 3 . . . cells was noted and compared with the number expected, calculated from the observed mean, using the χ^2 test as described by Fisher (1941).

The results were (ungrouped):

	Males	*Females*	*Total*
Mean	97·033	100·167	98·6
Variance	2063·8	2634·0	2515·8
Standard deviation ..	45·43	51·32	50·158
St. deviation of sampling:			
of mean	8·294	9·370	6·475
of variance	379·98	484·97	359·56

For the 60 observations $\chi^2 = 158·86$ for n = 177, whence P = 0·33; hence the method appears entirely satisfactory. There is no evidence of any sex difference. From this series it appears probable that about 5% of normal subjects have counts exceeding 190 per c.mm., but not more than 1% exceed 240 per c.mm.; therefore the normal range should be regarded as 0–240 per c.mm.

For routine work, two pipettes should be filled, and one Fuchs-Rosenthal chamber filled from each. If the whole ruled area (3·2 sq. mm.) is counted and 104 eosinophils or more are found, corresponding to a count of 325 per c.mm., it is certain that eosinophilia is present.

COMMENTS

The method has proved invaluable; it is possible to demonstrate a mild degree of eosinophilia (400–500 per c.mm.) in most quiescent asthmatics, but its principal use has been in following the treatment of patients with injections of gold salts. Hulst (1937) has shown that toxic manifestations of chrysotherapy are associated with eosinophilia, and he recommended routine differential counts for its early detection. In a few personal cases without toxic manifestations no change in the eosinophil count could be detected; but in one case of dermatitis 1100 and in a case of stomatitis 8800 eosinophils per c.mm. were found; these counts returned to normal only after six or seven weeks.

SUMMARY

It is quicker and more accurate to determine the eosinophil count of blood in a hæmocytometer, using a special diluting fluid, than to do a differential count using stained films.

The normal range of eosinophils is 0–240 per c.mm. Not more than 1% of normal subjects should have counts above this.

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NUTRITIVE VALUES OF WHEAT FLOURS OF DIFFERENT EXTRACTION-RATE

HARRIETTE CHICK C.B.E., D.Sc. Lond. and Manc.
A. M. COPPING M.Sc. N.Z.
E. B. SLACK B.A. Camb.

From the Division of Nutrition, Lister Institute

FOR practical purposes it is convenient to consider the wheat grain, after removal of the husk, as composed of three main fractions: the inner portion or starchy endosperm, the germ, and the bran. The protein contents of these three fractions are given in table I.

TABLE I—PROTEIN CONTENT OF FRACTIONS OF WHEAT GRAIN *
Protein content (N × 5·7) of the whole grain = 12·5%

Fraction	Percentage (by weight) of grain	Protein in fraction	
		Per cent.	As percentage of total protein in grain
Endosperm	83·5	11·1	73·3
Bran (including aleurone layer) ..	15·0	18·7	22·3
Germ	1·5	36·7	4·4

* From Girard (1884) and Osborne and Mendel (1919).

These fractions do not correspond to the natural morphological divisions; for the *bran*, which constitutes 12–15% of the weight of the grain, contains, besides the outer fibrous integuments, the layer of aleurone cells, filled with protein and fat granules, which is morphologically an outer part of the endosperm. The bran is, however, firmly attached to the fibrous layers of the pericarp and not separated from it during ordinary milling. This explains the high protein content of the bran. Girard (1884) from his own researches concluded that the aleurone layer formed two-thirds of the weight of the bran and contained three-quarters of its nitrogen or about 16% of the protein of the grain. In the milling of wheat to form white flour, which contains only the starchy endosperm, about a third of the protein of the grain is diverted to the offals. The difficulty in separating the aleurone layer has to a large extent prevented the investigation of its nutritive value, and the problem has only been attacked indirectly by feeding bran, in which case the result is complicated by the low digestibility of the fibre in the pericarp.

The *germ* of the grain, which includes the embryo (radicle and plumule) and the scutellum in which it is enclosed, is the richest in protein, but its proportion by weight is only 1·5–2·5%; hence the contribution of its protein to the total amount is small. But the nutritive quality of this protein is high, being of the same order as that of the proteins of milk.

Not only is the protein content greater in the germ and the outer layers of the grain, but the B vitamins are also concentrated here. Flours, therefore, which contain these parts have a higher nutritive value because of their higher vitamin content (Copping and Roscoe 1937,

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Abbé, E. (1878) *S.B. jena Ges. med. Naturw.* p. 98.
Barnett, C. W. (1933) *J. clin. Invest.* **12**, 77.
Bryan, W. R., Chastain, L. L., Garrey, W. E. (1935) *Amer. J. Physiol.* **113**, 416.
Dunger, R. (1910) *Münch. med. Wschr.* **57**, 1942.
Fisher, R. A. (1941) Statistical Methods for Research Workers Edinburgh, § 16.
Galambos, A. (1910) *Wien. klin. Wschr.* **23**, 1748.
Goldner, F. M., Mann, W. N. (1938) *Guy's Hosp. Rep.* **88**, 54.
Hulst, D. L. (1937) *Acta rheum., Amst.* **9**, 4.
Lyon, J. F., Thoma, R. (1881) *Virchows Arch.* **84**, 131.
MacGregor, R. G. S., Richards, W., Loh, G. L. (1940) *J. Path. Bact.* **51**, 337.
Student (1907) *Biometrika*, **5**, 351.
Treadwell, F. P., Hall, W. T. (1924) Analytical Chemistry, London, vol. ii.

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Copping 1938, Lepkovsky 1944). Recent work has demonstrated in greater detail the contributions made by the bran, endosperm, and separate fractions of the germ to the total amount of the different B vitamins present in the grain. The values given in table II are taken from the paper by Moran and Drummond (1945).

The germ has long been recognised as that portion of the grain richest in vitamin B_1, which is situated chiefly in the scutellum or layer of active parenchymatous cells enclosing the radicle and plumule. The scutellum is stated to provide about 60% of the total vitamin B_1 of the wheat kernel (Hinton 1944).

The outer layer of the *endosperm*, of which samples were obtained by a scouring process from the bran to which it adheres, was estimated to amount to about 3% of the whole grain and contained a greater proportion of protein and a much greater proportion of vitamin B_1, riboflavine, and nicotinic acid than did the inner portions. Flours of 70% extraction, such as were used for bread-making before the war, contain only the starchy endosperm. In flour of 85% extraction, though most of the bran and fibre is discarded, some of the finer portions are included with the outer endosperm and portions of the germ. The composition of flour of 80% extraction is intermediate

TABLE II—CONTENT OF B VITAMINS IN DIFFERENT FRACTIONS OF THE WHEAT GRAIN. (MORAN AND DRUMMOND 1945)

—	Percentage by weight of grain	Vitamin B_1	Riboflavine	Nicotinic acid	Pyridoxine (vitamin B_6)	Pantothenic acid
		(µg. per g.)				
Whole wheat ..	100	3·6	1·6	50	4·2	5·1
Clean bran, including aleurone layer	12	4·8	5·0	250	13·8	2·4
Germ scutellum ..	1·5	165	15	60	14·6	8·5
Germ embryo ..	1·0	9	15	60		
Outer endosperm (approx.) ..	3·0	4·5	1·8	150	..	..
Bulk endosperm (by difference), including outer endosperm ..	85·5	0·6	0·7	22	1·8*	3·0*

* 75% extraction flour.

between these two. As the degree of extraction is increased from 70% to 100%, the bread becomes progressively darker. Bread made from flour of 80% extraction may be described as off-white; that from flour of 85% extraction (the national flour of the war years 1942–44) is a shade darker; and that made from whole-wheat flour is definitely brown.

The problem confronting those responsible for the nation's bread is to provide a loaf for general use which shall be appetising and palatable and shall contain as much as possible of the more nutritious fractions of the grain. The war-time national flour of 85% extraction, adopted largely from reasons of economy, offered a compromise which was generally approved. The more recent investigations described above raised hopes that a whiter flour of 80% extraction might be obtained which would include the outer endosperm and the scutellum of the germ, and, while producing a more acceptable and appetising loaf, would also retain the nutritive value of the former flour of 85% extraction (Woolton 1945, Ministry of Food 1944). These hopes, however, for which there were theoretical grounds, have not yet been realised (Moran and Drummond 1945) and the alternative policy of artificial enrichment by addition of synthetic vitamins has been under consideration (Ministry of Food 1945).

It seemed worth while, therefore, to make a further investigation of flours of 70, 80, 85, and 100% extraction for their content of the B vitamins and for the nutritive value of their proteins. The different flours (series K) were provided by the Cereals Research Station of the Ministry of Food, were all milled from the same grist, and, except the whole-wheat flour, were prepared in ton lots on a semicommercial scale. The results of this study are described below. Tables are also included of additional results obtained recently by ourselves and other workers in this field.

CONTENT OF B VITAMINS

Early studies of the composition of wheaten flours, collected and reviewed by Copping (1938), showed that the vitamin-B_1 content of flour was raised with increasing extraction, with a sharp rise above 75% extraction. Studies carried out in this laboratory since 1939 (Copping 1943) have confirmed these findings and have extended the observations to the content of riboflavine, pyridoxine, and other factors of the vitamin-B_2 complex. The figures given in table III show the relatively high

TABLE III—PERCENTAGE DISTRIBUTION OF B VITAMINS IN FLOURS AND PORTIONS OF GRAIN

Type of flour	% Extraction	Vitamin B_1	Riboflavine	Vitamin B_6
		(µg. per g.)		
Wholemeal ..	100	4·20	2·3	4·0
National flour	85	3·45	2·0	3·3
White flour ..	73	1·05	0·85	2·0
Weatings ..	..	..	4·0	10·5
Bran	..	..	4·8	..
Germ ..	..	..*	7·8	10·0

content of these vitamins in the bran, germ, and weatings (or middlings).

In table IV is given a series of results obtained by McCance et al. (1945) from many Manitoba wheats; these

TABLE IV—CONTENT OF PROTEIN AND B VITAMINS IN A SERIES OF FLOURS MILLED FROM MANITOBA WHEAT. (MCCANCE ET AL. 1945)

% Extraction	Protein % (N × 5·7)	Vitamin B_1	Riboflavine	Nicotinic acid
		(µg. per g.)		
100	13·62	3·54	1·7	55·0
85	13·57	2·76	1·0	13·3
80	13·22	1·95	0·8	11·0
70	12·77	0·66	0·7	8·4

show the progressive fall in vitamin value of the flours with decreasing degree of extraction of the grain. Taking the contents in whole-wheat flour as 100, the loss in the milling of the flours of 85, 80, and 70% extraction was 22, 45, and 81% respectively for vitamin B_1, and 41, 53, and 59% for riboflavine.

The results of analysis of the K series of flours is shown in table V. The figures for riboflavine, nicotinic

TABLE V—CONTENT OF PROTEIN AND B VITAMINS IN THE "K" SERIES OF FLOURS,* MILLED FROM A GRIST OF MIXED WHEAT

% Extraction	Protein % (N × 5·7)	Vitamin B_1	Riboflavine	Nicotinic acid	Pantothenic acid	Biotin
		(µg. per g.)				
100	12·65	3·24	0·84	49·2	7·82	0·081
85	12·48	3·15	0·71	24·3	4·48	0·047
80	12·02	2·49	0·45	17·2	3·98	0·032
70	11·57	1·09	0·32	12·0	2·96	0·020

* All values are calculated to 87% dry weight.

acid, pantothenic acid, and biotin were obtained by microbiological estimations carried out by the Royal

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Air Force nutrition team at the School of Agriculture, Cambridge, and those for vitamin B_1 by the thiochrome method at the Cereals Research Station at St. Albans. These figures show a similar drop in vitamin value as the extraction of the grain is lowered from 85% to 80%, the latter flour being 21% and 37% lower than the former in vitamin B_1 and riboflavine. Biological estimations of riboflavine* were also made on the above flours of 85% and 80% extraction; the criterion was the rate of weight increase of young rats. The flour of 80% extraction contained about four-fifths of that present in the flour of 85% extraction, a figure which confirmed results of tests made with other samples of flours of 80% and 85% extraction made by the same methods.

CONTENT OF VITAMIN E

The germ of the wheat grain is one of the richest natural sources of vitamin E (tocopherol) and was the chief source of this vitamin until synthetic tocopherols became available. By means of a chemical method of titrating against ferric chloride, Engel (1942) studied the distribution of vitamin E in the wheat grain. The concentrations per 100 g. were 1·7 mg. in white flour of 70% extraction, 5·9 mg. in flours of 82–90% extraction and in flours of 90–100% extraction, and 27 mg. in wheat germ. Thus an increase in the extraction-rate of wheat provides an extra source of vitamin E in the diet.

NUTRITIVE VALUE OF THE PROTEINS

The nutritive value of the protein in the different flours of series K was compared by biological tests in which the flour in question was the sole source of protein in an otherwise complete diet, and the criterion adopted was the capacity to support growth in young rats newly weaned. With some modification the method was the same as that previously described (Chick 1942). A series of diets was prepared of equal N content containing respectively the 100, 85, 80, and 70% extraction flours of series K. Since the white flour had the lowest N content, the others were suitably diluted with small amounts of pure maize starch (N content about 0·03%).

The proportion of protein (N × 5·7) in the diets containing the flours to be compared was about 12% reckoned on the dry weight. This amount was suboptimal and was the factor limiting growth, other nutrient essentials being provided in adequate amount (Chick 1942). Groups of 5 or 6 rats receiving the same diet were treated as a single unit, and estimations were made of the intake of food and N for the whole group, and of the weight of the fæces passed and their N content.

This experiment, which will be reported in detail elsewhere, was planned to measure not only the weight increase corresponding to the amount of food and N consumed but also the proportion of the N consumed which was retained in the body. Accordingly, at the beginning of the test 2 litter mates from each of the 4 litters used were killed, and estimation was made of the total N contained in the "empty" bodies after the contents of the alimentary canal had been removed by washing. The bodies of the rats were similarly treated at the end of the test, which lasted seven weeks.

The results are shown in table VI, and the average weight curves of the different groups of rats in the figure. These show the rate of weight increase rising progressively as the extraction-rate of the grain is raised from 70% to 100%. The rats on the diets with flour of higher extraction-rate ate more food and utilised it better, the average weight increase per 100 g. of dry food consumed rising from 16·1 to 18·8 g.; the figure for flour of 85% extraction was not less than for whole-wheat flour; and that for flour of 80% extraction was 17·7.

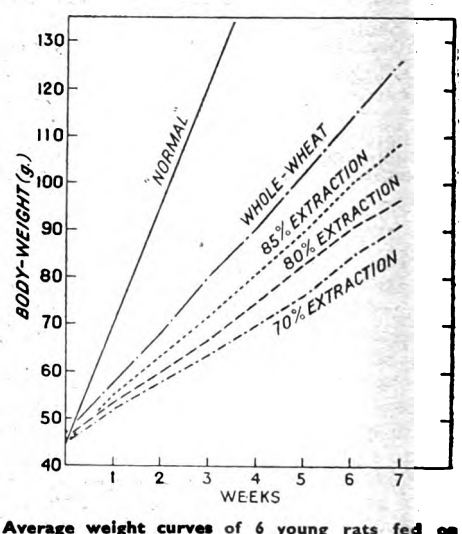
TABLE VI—NUTRITIVE VALUE OF PROTEINS CONTAINED IN WHEAT FLOURS (SERIES K) OF DIFFERENT PERCENTAGE EXTRACTION OF THE GRAIN

Figures represent average values per rat (of a group of 6 rats). Period of test = 7 weeks. All diets contained 2·1% N (12% protein) calculated on dry weight.

Percentage extraction of flour	Dry food eaten (g.)	N eaten (g.)	Coefficient of digestibility* of N (%)	Body-weight (empty) (g.)		Weight (empty) increase (g.)			N content of rat's body (g.)		% retained	
				Initial†	Increase	Per g. N eaten	Per g. N digested	Per 100 g. dry food eaten	Initial‡	Final	Of N eaten	Of N digested
100	408	8·46	81·0	42·8	76·9	9·1	11·2	18·8	1·19	3·47	26·8	33·3
85	333·5	6·98	85·5	40·0	64·1	9·2	10·8	19·2	1·11	2·90	24·0	30·2
80	298	6·30	86·7	40·7	51·9	8·2	9·5	17·4	1·13	2·57	21·2	26·4
70	285	6·00	88·8	41·2	45·9	7·6	8·6	16·1	1·15	2·50	21·9	26·6

* Coeff. of "apparent digestibility" = $\frac{\text{N intake} - \text{N in fæces}}{\text{N intake}} \times 100$.
† Calculated from that of litter mates.
‡ Calculated from analyses of litter mates.

The coefficient of (apparent) digestibility of the nitrogen in the diets, calculated as the percentage absorbed (N intake less fæcal N) of the nitrogen intake, fell from about 89 for the 70% extraction flour nitrogen to 81 for that of the whole-wheat flour; nevertheless the average weight increase per g. of nitrogen consumed rose from 7·6 to 9·1 g. The total nitrogen content of the rats' bodies at the end of the test, compared with the amount present at the beginning (as estimated from the analysis of litter mates), showed an increase of 2·28 g. of N per rat receiving the whole-wheat diet, whereas the figures for the rats receiving the flours of 85, 80, and 70% extraction were 1·79, 1·44, and 1·35 g. of N per rat. The proportion retained of the nitrogen fed showed a progressively falling series from 27% with the diet of 100% whole-wheat flour to 22% with that of the flour of 70% extraction.



Average weight curves of 6 young rats fed on diets containing flours of different percentage extractions; N content of diets 2·1% (protein ca. 12%). Normal (optimal) weight curve on diet containing 3% N (protein ca. 18%) derived from casein.

A comparison of the data for the different flours given in table VI indicates that, whereas the nutritive value of the nitrogen of flours of 85% and 80% extraction is intermediate between that of flours of 100% and 70%

* The actual values obtained by biological estimation for the flours of 85% and 80% extraction of series K were 1·35 and 1·12 µg. per g. respectively. These values are considerably higher than those shown in table V, obtained by microbiological methods. There are serious difficulties in correlating the results of biological and microbiological or fluorimetric estimations of riboflavine in cereals, in which the riboflavine seems to be present in some combined form which makes it difficult to extract it completely by chemical or enzymic methods. Since the results of biological determinations tend to be higher, it seems that the animal organism can utilise the bound riboflavine, and it may be reasonable to conclude that the biological estimation gives a truer estimate of riboflavine in flours.

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extraction, the flour of 85% extraction is nearer to the whole-wheat flour in this respect, and the flour of 80% extraction nearer to the 70% extraction flour.

This biological method for judging nutritive value of the proteins in different wheat flours has recently been criticised on two grounds. The first is that since the animals feed ad libitum and the flours of higher extraction are assumed to be more palatable, larger amounts would be eaten and better growth would result (Wright 1941). The second criticism is that, in comparing the value of the food proteins for support of growth, no allowance is made for the amount required for maintenance (Graves 1945).

These criticisms will be dealt with in more detail in a later paper, but it may be stated here in answer to the first objection that Mitchell and his co-workers (1943) showed that, when the intake of young rats receiving a wholemeal-bread diet was limited to that of litter mates on a white-bread diet, their rate of growth still remained greater. It may also be argued that increased appetite in itself is a sign of a higher nutritive value in a diet (Chick 1941).

In reply to the second criticism, if allowance is made from the most trustworthy data available of the amount of protein in a diet required for maintenance of young rats, the balance available for growth will still be found to be more economically utilised when a diet of whole-wheat flour is fed than when one of white flour is given.

The most striking differences in nutritive value between whole-wheat flour and flours of lower extraction are attributable first to the losses of B vitamins which occur in processing, as may be seen by reference to tables IV and V. The differences in amount and quality of the proteins contained in the different flours are less important, provided the diet is a generous one and contains a fair proportion of other protein foods. Under conditions of poverty or food scarcity, however, when bread forms an unduly large proportion of the food, an important nutritive advantage may be gained by adding even a small amount of extra protein of good quality, and by the supplementary action of the more varied mixture of proteins which is present in flours of higher extraction.

SUMMARY

The content of different B vitamins in wheat flours, milled to contain 100% (whole wheat), 85%, 80%, and 70% (white flour) of the grain, progressively decreases as the degree of extraction is lowered. The B vitamins tested included vitamin B_1 (aneurine), riboflavine, vitamin B_6 (pyridoxine), nicotinic acid, pantothenic acid, and biotin.

In many tests the content of vitamin B_1 and riboflavine in flours of 85% extraction was of the same order as that in whole-wheat flour; the content in flours of 80% extraction was usually much less.

In growth experiments with young rats a lowering of the growth-promoting value of the proteins in the flours was demonstrated when the degree of extraction of the wheat fell from 100% to 70% in spite of the fact that the digestibility of the nitrogen of the latter (coeff.=89%) was greater than that of the former (coeff.=81%). The productivity of the food and nitrogen consumed when the diet contained flours of 85% extraction was not inferior to that observed with whole-wheat (100%) flour; the proportion of the nitrogen consumed which was retained in the rats' bodies was, however, slightly less (24% compared with 26·8%). When the diets contained flour of 70% extraction lower figures were obtained; with flour of 80% extraction the figures obtained were intermediate.

We wish to thank Sir Charles Martin for his advice and helpful criticism and for his hospitality at Roebuck House, Cambridge, where the experiments were carried out; the Ministry of Food for providing the flours of series K; Mr. T. Moran, D.Sc., and Wing-Commander T. F. Macrae for permission to include the unpublished results given in table V; and Mr. G. W. Flynn for his technical assistance.

References at foot of next column

Medical Societies

ROYAL SOCIETY OF MEDICINE

AT a meeting of the urological section on Jan. 31, with Mr. A. WILFRID ADAMS, the president, in the chair, a discussion on

Retropubic Prostatectomy

was opened by Mr. TERENCE MILLIN. In advocating his new operation of retropubic prostatectomy, he said, he felt rather like a lawyer defending his own child. In his view, it was the most universally applicable procedure for prostatic obstruction, and after using it in 85 cases he had found it better than any other, except for cases of prostatic fibrosis, where endoscopic resection was still the method of choice. Unfortunately, prostatic obstruction was still not seen early enough; but neither had operation in the past been safe enough to justify urging its early use. In deciding whether the new procedure was in fact better than its predecessors, some idea of previous attainments was given by the overall mortality of some 10% for the Harris operation by the surgeons associated with St. Peter's Hospital.

It was well known that in the two-stage Freyer the preliminary cystotomy was more deadly than the subsequent prostatectomy itself; and at St. Peter's this first step had carried a mortality of 19%. And it was always possible that the second stage might be found impracticable, leaving the patient with a permanent fistula. Moreover, these procedures carried real risks of late complications—shelf-formation after the Freyer operation; bladder-neck obstruction, urethral stricture, and temporary or permanent incontinence after the Harris. Endoscopic resection attracted the patient because it left no visible scar, and it was of value for fibrosis and for the poor risk. But the possible catastrophes were well known: as the gland could never be completely removed, there was danger of recurrent obstruction and persistent infection; and there was the bugbear of late urethral stricture. The last was eminently due to the use of an over-large cold punch, an instrument which should never be over 28 French in calibre.

Perineal prostatectomy had never been popular here; at times it led to ghastly sequelæ, with complicated external and internal fistulæ. Retropubic prostatectomy, however, might be regarded as virtually the perineal operation, performed well away from the rectum. Anatomically, most of the vessels were posterior and free from risk, together with the ejaculatory ducts, but it was necessary to beware of certain anomalies of arterial supply—an accessory pudendal, an aberrant obturator, or the dorsal artery of the penis arising from the obturator. The operation was not done in a deep dark recess, but entirely under vision, for the internal meatus was a fixed point at the upper border of the symphysis, or even higher in cases of obstruction. An important feature of the operation was its respect for the integrity of the internal sphincter: in the transvesical procedures gross stretching of this structure caused shock and left it patulous, with continence dependent on the efficiency of the compressor urethræ. Mutilation of the bladder neck was avoided, save for a wedge-resection in cases of sclerosis. Moreover, since the trigone was only spread out over an adenoma, it could be stripped off and

DR. CHICK AND OTHERS: REFERENCES

Chick, H. (1941) *Brit. med. J.* ii, 790.
— (1942) *Lancet*, i, 405.
Copping, A. M. (1938) *Nutr. Abstr. Rev.* 8, 555.
— (1943) *Biochem. J.* 37, 12.
— Roscoe, M. H. (1937) *Biochem. J.* 31, 1879.
Engel, C. (1942) *Z. Vitaminforsch.* 12, 220.
Girard, A. (1884) *Ann. Chim. (Phys.)* 3, 289.
Graves, H. C. H. (1945) *Chem. & Ind.* no. 19, p. 146.
Hinton, J. J. C. (1944) *Biochem. J.* 38, 214.
Lepkovsky, S. (1944) *Physiol. Rev.* 24, 239.
McCance, R. A., Widdowson, E. M., Moran, T., Pringle, W. J. S., Macrae, T. F. (1945) *Biochem. J.* 39, 213.
Ministry of Food (1944) High Vitamin Flour, London.
— (1945) Report of the Conference on the Post-war Loaf, London.
Mitchell, H. H., Hamilton, T. S., Shields, J. B. (1943) *J. Nutrit.* 25, 585.
Moran, T., Drummond, J. C. (1945) *Lancet*, i, 698.
Osborne, T. B., Mendel, L. B. (1919) *J. biol. Chem.* 37, 557.
Woolton, Lord (1945) see *Lancet*, i, 321.
Wright, M. D. (1941) *Brit. med. J.* ii, 689.

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left undisturbed. The postoperative urethrograms were more like the normal than after any other method. After the classical procedures the patient, if still potent, had little or no seminal emission, since sphincter incompetence allowed a reflux into the bladder; but after retropubic prostatectomy ejaculation was still a possibility.

In the preoperative period the good-risk case was left without any instrumentation; a cysto-urethroscopy was done only on the table, when the final decision on immediate operation was made. Preliminary cystotomy was avoided as far as possible. Patients with acute retention were catheterised and given sulphanilamide and forced fluids. An indwelling catheter for 7–10 days was used for chronic retention, with gradual decompression for the first 24 hours: only the exceptional cases —i.e., those with gross retention and poor renal function —needed suprapubic drainage once proper catheter drainage was provided; there was insufficient faith in the catheter alone. Preliminary cystotomy was needed to remove a large vesical calculus with infection, but small stones could be removed from below after the actual prostatectomy. Mr. Millin did not feel that diverticula routinely called for removal as a separate primary procedure, and was prepared to do his operation in their presence; he would not leave them all, but some deep and difficult ones were better left alone, provided the prostatectomy was efficiently done. For the calculous prostate, always a problem, a one-stage operation was hazardous, and a preliminary cystotomy advisable.

Mr. Millin then described the steps of the operation in detail (see *Lancet*, 1945, ii, 693) and showed a short film of the procedure. Enucleation was easy, and there was rarely any need for deliberate hæmostasis in the prostatic bed. A urethral catheter was guided under vision into the bladder, and anchored by a stitch to the prepuce. The retropubic space was dusted with sulphanilamide, and drained. After operation it was important to confirm at once that the catheter was properly in situ and draining the bladder. The spigot was removed only at 2-hour intervals, for its presence helped the recovery of bladder tone. He had originally removed the catheter at the 6th–7th day but now tended to do so around the 3rd day, by which time the patient was up and voiding urine naturally. There was occasional suprapubic leakage for 24 hours, and sometimes spasm and retention for a short time after removing the catheter. The urine cleared rapidly and remained uninfected.

Complications were rare. There had been 4 deaths in his 85 cases, 2 from pyelonephritis and 2 from cardiac failure, and 1 of these had severe secondary hæmorrhage. The latter usually responded to lavage. Leakage in some cases might be due to premature absorption of catgut and slipping of the catheter, and he now used no. 1 chromic gut for a watertight closure of the prostatic capsule. It was too early to say anything about late urethral stricture, though timely dilatation of a soft infiltration would be desirable. There had been no fistula, thrombosis, or pulmonary embolism; nor any incontinence, for both sphincters were preserved. Clot-retention was easily handled via the catheter; if not, removal of a skin suture or two allowed the insertion of a tube into the bladder.

The operation was no more difficult as a second stage, for the cave of Retzius did not become the site of adhesions; 11 of his series had been so done. It was easier to learn than the Harris or perineal procedures, its mortality was lower than any, save possibly with endoscopic resection, and the convalescent course was exceptionally smooth and painless. The stay in hospital was much reduced.

DISCUSSION

The PRESIDENT said that though this was a great occasion, there was still a need for objective criticism. Mr. Millin had removed the obstruction to bladder outflow directly, where the rest of the world traversed the dammed-up receptacle. Though the originator scorned the fear of sepsis in the cave of Retzius, he himself had had instances of parietal sepsis after a few days, and in one fatal case autopsy revealed residual adenomatous masses in the bladder. It was essential to be certain of complete removal, for there was no opportunity to look inside the bladder at the time of operation. He agreed that early pain and spasm in convalescence did not occur, but had observed acute vesical crises, with retention, at the 8th–10th day. It might turn out that the operation was peculiarly applicable to the "closed" type of prostatic cancer case.

Mr. E. W. RICHES praised the principles of direct approach and of enucleation from below, but pointed out that the approach was through a vascular area and the operation was in fact a bloody one. He preferred to fix his catheter by a stitch through the bladder to the abdominal wall, and was troubled by the risk of urethritis. Because there was urethroscopic evidence of sloughing after a fortnight, he kept his patients in for 3 weeks. Future developments would largely hinge on the ability to remove the catheter early, on the 3rd or 4th day.

Mr. R. OGIER WARD agreed that there was no need to defend the old operations—they needed attacking. Retropubic prostatectomy sounded easy but required considerable skill and could easily be discredited by poor surgery. Moreover, once begun it could not be abandoned with a tube left in the bladder, so each step must be carefully performed.

Mr. H. K. VERNON advised ignoring the bleeding in order to get on quickly with the operation; the bleeding always stopped when the prostatic capsule was sutured.

Mr. A. H. JACOBS had had 1 death in a case where it had been impossible to return the catheter into the bladder after it had slipped out. He sent his patients home after 12–16 days.

Mr. CLIFFORD MORSON (in a letter) agreed that the present multiplicity of techniques argued the unsatisfactory state of prostatectomy so far. The only anxiety he had about Mr. Millin's operation was over the tied-in catheter blocking the outlet from a closed bladder. He did not feel that there was now any reason for a case of prostatectomy in private dying from any urinary cause, and this was partly due to the advances in chemotherapy in recent years.

Mr. A. E. ROCHE held that the main advantage of the operation lay in its truly radical nature, but thought the two-stage Freyer would always survive. He preferred the term "prevesical" to "retropubic," and had heard of gangrene of the penis as a complication.

Mr. H. P. WINSBURY-WHITE still found it necessary occasionally to trim the posterior margin of the bladder neck to avoid subsequent obstruction, and believed in resecting even small diverticula in view of the risk of stubborn infection. Mr. L. N. PYRAH felt that retropubic prostatectomy was not an operation for the occasional operator and spoke of the possible danger of a closed infected cavity. Mr. F. M. LOUGHNANE wondered whether the operation might not sometimes prove impossible in a narrow deep pelvis.

In reply, Mr. MILLIN said he was agreeably surprised at the warm reception of his operation. He had had no case of parietal sepsis, and there should be no risk of leaving adenomata or bladder-neck tags, for this region was clearly seen and felt before closure. He cast doubt on the conception of the "closed" cancer case; metaplasia in the prostate was so common that this largely pathological diagnosis after removal rarely corresponded with the actual facts of survival. He disliked the abdominal retention stitch for the catheter, since the latter might be kinked or angulated; the risk of urethritis was small because the period of catheterisation was so short. The prostatic cavity closed itself, and he made no effort to close it apart from the capsular suture. Venous bleeding stopped as soon as the adenoma was out, and he had had no difficulty in replacing a slipped catheter. There was no spasm, for the intact sphincter kept all clot out of the bladder. He did not feel that the depth of the pelvis was at all a limiting factor since the bladder neck was a fixed point at the upper edge of the symphysis in every case.

ARRANGEMENTS to bring 200 French children to England have been made by the Save the Children Fund and the Emergency Council for Help to France. Some of the children come from families which helped R.A.F. men who baled out; the parents of others were killed by British bombing or while fighting in the Maquis. They will be settled in a camp provided by the Government.

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THE LANCET
LONDON : SATURDAY, FEBRUARY 9, 1946

Congenital Defects from German Measles

IT is more than four years since GREGG [1] in Sydney reported that congenital malformations—cataract, deaf-mutism, or other defects—were occurring in infants whose mothers had had german measles early in pregnancy, and nearly three years since SWAN and his colleagues confirmed his findings in a survey supported by the National Health and Medical Research Council of Australia. Since then further confirmation of the association has come from the United States. Yet here, though the war has not stopped other research into infant mortality and morbidity, nobody seems to have taken the few simple steps needed to find out whether rubella is a serious cause of congenital defects in this country. The published evidence has undoubtedly established a case for inquiry at once.

At first glance the likelihood of a causal relationship between congenital defects and maternal rubella seems small. Why, it will be asked, has this alleged association not been observed before? Old wives are ready enough to ascribe these defects to maternal misadventures, misencounters, evil practices, bad thoughts, nightmares, and what not; would they have overlooked a rash with fever, however trivial? Why has no-one yet diagnosed rubella in early pregnancy and followed the case to the birth of a defective child? Why, too, should a mild disease like rubella produce such serious lesions when severe infections such as measles leave the child unharmed? Admittedly in the Australian communities affected an epidemic of sore throat with rashes (commonly classified as toxic erythema or erythema infectiosum) was prevalent at the same time as rubella; and in no instance was the diagnosis of rubella confirmed by discovery of Türk cells and other changes in the white blood-picture. Moreover, GREGG noted that the rubella was exceptionally severe and led to exceptionally severe complications, while the cataract was in his view different from congenital cataracts previously described. The Australian evidence by itself might suggest that a new disease had emerged, and indeed when the rubella-malformations association was reported in America it was thought that a new disease or a virulent form of rubella had been imported from Australia by Service personnel. But the increasing number of reports from widely scattered places—including a few from England—make it likely (though not yet certain) that ordinary german measles does cause fœtal damage. Of GREGG's original series of 78 cases of cataract, usually associated with cardiac or other lesions, a definite history of rubella was obtained in 68; these were collected from the states of New South Wales, Victoria, and Queensland. SWAN and his co-workers,[2] in their survey in South Australia, found congenital defects in 36 out of 57 children whose mothers had had an exanthem during pregnancy, and in 31 instances the mother had had an illness diagnosed as rubella, nearly always in the first three months of pregnancy; in 7 cases the maternal illness was measles and in 1 mumps. Of 25 mothers who had rubella in the first two months the offspring had congenital defects in every instance (100%); of 8 mothers attacked in the third month 4 offspring had lesions (50%); but after the third month the number was only 2 out of 16 (12%). Among the 31 infants the distribution of defects was: cardiac 17 (in combination with cataract in 8, with deaf-mutism in 2, and with buphthalmos in 1), ocular 14, deaf-mutism 7, mental retardation 4, hypospadias 1, and talipes equinovarus 1; also the majority were underdeveloped and presented feeding difficulties. Later [3] 11 cases of defects were recorded in which 10 mothers had a history of rubella. EVANS [4] found congenital dental abnormality and retardation of eruption in 23 out of 34 babies whose mothers had rubella, the defects being most pronounced when attack took place between the 6th and 9th weeks of gestation. WELCH [5] gives a table of children born deaf in New South Wales each year from 1931 to 1941; in only one year did the number reach double figures, but in 1938 it reached 47, and in 34 of these cases a definite history of german measles in the first four months of the mother's pregnancy was obtained; all the rubella cases showed islands of hearing. From the United States cases have been reported by REESE [6] (3), RONES [7] (4, 1 following measles), ERICKSON [8] (11), ADAMS [9] (2), GREENTHAL [10] (2), PERERA [11] (1), and ALBAUGH [12] (9); while in England 2 cases were published by SIMPSON [13] and one by HUGHES.[14]

It is possible to recognise a clinical pattern in the mass of data accumulated. Although REESE found the first four weeks of pregnancy to be the critical period for both ocular and cardiac lesions (2 of his cases were born seven and twelve days prematurely) most writers put it later—4th to 8th week for ocular and 5th to 8th week for cardiac defects, periods when the active development of these tissues would render them particularly vulnerable to virus assault. It is possible that the virus may remain viable in the tissues for some time, and only an accident such as trauma or temporary interference with vascular supply may determine the developmental lesion; probably the effect of the virus is to cause temporary ischæmia, either primary or secondary to a perivascular cellular reaction, resulting in malnutrition of the affected tissues. It seems likely that other infective conditions would produce similar lesions, but rubella is peculiar in that it affects adolescents and young adults more commonly than the other infectious fevers. It may be, too, that the more virulent infections produce abortion or death of the fœtus rather than mere defects of development; this is another question which deserves study.

Here, then, if ever there was one, is an urgent subject for investigation in this country. At last there is a chance of attacking the incidence of congenital

1. Gregg, N. McA. *Trans. ophthal. Soc. Aust.* 1941, 3, 35.
2. Swan, C., Tostevin, A. L., Moore, B., Mayo, H., Black, G. H. B. *Med. J. Aust.* 1943, ii, 201.
3. *Ibid*, 1944, i, 409.
4. Evans, M. W. *Ibid*, 1944, ii, 225.
5. Welch, L. St. V. *Ibid*, 1945, i, 574.
6. Reese, A. B. *Amer. J. Ophthal.* 1944, **27**, 483.
7. Rones, B. M. *Med. Ann. Dist. Columb.*, 1944, **13**, 285.
8. Erickson, C. A. *J. Pediat.* 1944, **25**, 281.
9. Adams, F. H. *J. Lancet*, 1945, **65**, 197.
10. Greenthal, R. M. *Arch. Pediat.* 1945, **62**, 53.
11. Perera, C. A. *Amer. J. Ophthal.* 1945, **28**, 186.
12. Albaugh, C. H. *J. Amer. med. Ass.* 1945, **129**, 719.
13. Simpson, R. E. H. *Lancet*, 1944, i, 483.
14. Hughes, I. *Proc. R. Soc. Med.* 1945, **39** 17.

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defects at their roots. Hitherto, though preventive and therapeutic measures have found increasing success in reducing the number of babies blinded by neonatal infections, the factors which maim or kill the fœtus in utero—with some outstanding exceptions such as syphilis or smallpox—have seemed beyond our reach. The suggestion that virus infections in the mother rank high among these factors opens up a new field for research. The first step seems to be to find out whether there is any significant association in Britain between congenital defects and rubella. This can most simply be done at schools for deaf and blind children by inquiring into the history of the mothers' pregnancies. Admittedly the results, being dependent on the mother's memory and diagnostic ability (for german measles is often self-treated), will be unreliable, especially when the german measles story gets about. But a valuable check is provided by the time-relation of the rubella; if, for example, 10% of the mothers of children with congenital nerve-deafness recall a feverish illness with rash *in the second or third month of pregnancy* this can hardly be put down to coincidence. For though german measles is the commonest exanthem in adults the chances of a mother catching the disease early in pregnancy are very small indeed—a rough estimate could no doubt be made on the figures from Manchester, one of the few places where rubella has been notifiable. It might be possible, too, in some areas for the medical officer of health to check the mother's diagnosis by referring to his records of rubella epidemics. A rough survey of this kind could be completed in a few weeks, and would show whether rubella in Britain is a rare cause of defects, or, as the evidence from other countries suggests, a main one. In the latter case all possible preventive measures should be applied at once, without waiting for the more accurate knowledge of incidence which only a protracted inquiry can bring.

It will be for a research scholar or team to collect further evidence at leisure. The past records of antenatal clinics are unlikely to provide the required information, because german measles has not hitherto seemed worth inquiring for. From now on the clinics will no doubt take careful note of all infections and rashes arising in pregnancy, and in time such notes would bring the answer. Another method of approach would be via the midwives. The medical officer of the supervising authority in, say, half a dozen sample areas might ask his midwives to supply a full report on infections occurring in pregnancy in all their booked cases—both positive and negative reports would be required—and it might be the rule that any fever or rash would be immediately reported to the medical officer, so that when german measles did arise the diagnosis could be confirmed. This again might take years to produce convincing figures. What is needed is a research scholar who will choose the most promising lines of inquiry and will have sufficient official backing and secretarial assistance to follow them up. Lately, under the will of Lady LUDLOW, a large sum of money has been bequeathed for the prevention and cure of blindness and deafness. The trustees would need to go far to find a more promising object for a grant than the establishment of a research fellowship to inquire into the ætiology and prevention of congenital defects.

A Complete Maternity Service

IN their latest broadsheet[1] P.E.P. remind us that between the wars the indices of maternal mortality rose instead of falling, and by 1934 were higher than at the beginning of the century. In retrospect it seems that much of the blame can be placed on malnutrition, unemployment, and other evils of economic insecurity. Nevertheless two departmental committees—one on maternal mortality and morbidity, in 1928, and one on abortion, in 1939—revealed many examples of perfunctory antenatal and postnatal care, hurried midwifery, poor accommodation, and neglect of the social needs of mothers. P.E.P. note that the total loss of life from the "obstetric mortalities" is now gradually diminishing but is still substantial: in 1938 the maternal-mortality rate in England and Wales was 2·97 per 1000 births, the stillbirth rate 38 per 1000 births, and the neonatal death-rate 28 per 1000 live births—representing the deaths of 1917 mothers and 42,301 infants. In 1942 these rates had dropped to 2·54, 33, and 27, with the loss of 1673 mothers and 39,953 infants—still a large toll of life. Moreover, infant deaths during the first week of life, which are closely associated with the health of the mother during pregnancy, have fallen hardly at all for several years.

Our maternity services, though extensive, have little unity. The pregnant woman passes through too many hands and is advised by too many tongues; yet if anything goes wrong at her confinement she may after all be attended by a doctor who has never set eyes on her before. In their attempt to look ten years ahead, P.E.P. lay chief emphasis on team-work and continuity of attention. Though a mother may need many kinds of skill, and the care of many kinds of people during her pregnancy and labour, these many advisers must work together. Among the essentials of a complete maternity service the broadsheet includes antenatal advice by doctors and midwives; consultant advice in all cases suspected of difficulty; dental, orthopædic, or other treatment needed to improve the well-being of the mother; beds for antenatal care when necessary; free choice between confinement at home and in an institution; postnatal care; breast-milk service on the doctor's advice; hospital care for premature and weak babies and their mothers; proper instruction of mothers; measures to mitigate pain during labour; adequate domestic help; and special emergency obstetric units and resuscitation teams to be called in when the mother confined in her own home develops sudden complications. There is nothing new or extravagant in these standards: the problem is simply how to achieve them for every mother in the country. "In the opinion of medical teachers," P.E.P. say, "the best service is one which places the midwife in charge of the normal case"; and "if it is considered right, from the medical point of view, to make the midwife responsible for normal labour," it should be possible to convince mothers that this arrangement is the best. At present there is a sort of class prejudice against midwives, which will have to be removed by education of the public: and the record of the midwives will be the best argument to convince them.

1. A Complete Maternity Service. *Planning* no. 244, Jan. 31, 1946. P.E.P. (Political and Economic Planning), 16, Queen Anne's Gate, London, S.W.1.

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"If doctors use their authority to raise the status of the midwife in the public estimate, they will help in building up a balanced maternity team for the future service." The midwife, however, must not only be well trained and experienced, and able to judge when a doctor's help is needed, but also able to offer relief of pain. At present there are in England and Wales over 16,000 midwives who have stated their intention to practise as such, and though they are well trained in midwifery only 2675 of them are qualified to give gas-and-air analgesia. The decision of the Central Midwives Board to make training in the administration of analgesia compulsory for all midwives qualifying after next June is a further step on the way to a first-class domiciliary service.

The position of the general practitioner in the service is carefully discussed. Many doctors in general practice do not care for midwifery, whereas others have had long and valuable experience of large numbers of confinements. Because of this variation in interest, skill, and experience, it is obviously impossible to give a hard and fast ruling about either the rights or the ability of general practitioners to undertake midwifery. Against the view that every family doctor should do his share of midwifery as it comes along, it is argued that "normal midwifery does not require a full medical training and it would be a waste of medical man-power to expect doctors to do it." On the other hand, "abnormal midwifery requires more than a general medical training and should only be done by doctors with special experience and constant practice." If a practitioner sees only about half a dozen cases a year, and has no great wish to see more, he is hardly the person to whom the midwife should have to turn if she finds her patient in difficulties. Equally it is absurd that a young doctor who has taken special qualifications or gained special experience in obstetrics should be absorbed into antenatal work and never see a woman in labour again. P.E.P. believe that most of these anomalies can be overcome if midwifery, like other ancillary services, is in the future based on the health centre. Among four to ten doctors practising as a group it should be possible—provided competition for patients or fees can be excluded—to ensure that the maternity work falls to the one or two who are interested and experienced in midwifery. These would be able to make their own antenatal and postnatal examinations and to refer cases to consultants when necessary. The midwife would also work from the health centre and would be present when the doctor examined her cases before term, so that she could confer with him about them. In rural areas it may be necessary to bring the maternity service to the mother rather than expect her to travel long distances. A mobile unit based on the nearest hospital and staffed by experienced doctors, midwives, and health visitors could hold its sessions in village halls and other suitable buildings. Future community centres, it is suggested, might set aside rooms for the purpose. The mobile unit would also undertake education and the distribution of food supplements.

The aim, as P.E.P. see it, is to achieve a more uniform service—one in which every woman can count on getting essential care and continuous supervision by members of a team. This means that the administrative structure of our present maternity services must be greatly simplified. They point out, however, that even the best administration and service would founder on the rocks of public ignorance and prejudice. The mothers must be taught how they can best be looked after; and it would be a pity if their enlightenment was hindered in any way by prejudices within our own profession.

Annotations

SURGERY AND COARCTATION OF THE AORTA

A REMARKABLE step forward in the surgery of the heart and great vessels has been the excision of the contracted aorta, with restoration of vascular continuity, by Clarence Crafoord, of Stockholm. Last year, with Nylin, he recorded [1] two successful cases, and at a lecture on Jan. 24 to the Society of Thoracic Surgeons he added five further cases, four of them successful.

There are some forms of aortic coarctation which clearly could not be considered for surgery, but the uncomplicated "adult" type in which the stenosis has become extreme may now be regarded as a potential case for radical treatment. The clinical picture depends on several effects of the stricture. Below the stricture the circulation is poor, and the femoral or popliteal pulse will be diminished; this may give rise to signs of intermittent claudication. Above the narrowing the aortic arch and great vessels are dilated, and the blood-pressure is much higher in the arms than in the legs. Hypertension is common and is probably due more to mechanical than to "essential renal" causes. The extensive collateral circulation developed round the coarctation produces large and tortuous intercostal and internal mammary vessels which may actually erode the ribs. Surface evidence of the anastomosis is usually obvious. With this unenviable future in store for patients with severe coarctation any attempt at surgical relief seems fully justified. The careful medical investigation of school-children in Sweden has been responsible for the recognition of cases which otherwise might have reached hospital only in the advanced stages; some of Crafoord's cases were originally diagnosed in this way.

Preliminary experiments demonstrated that the blood-supply to all organs could be occluded for 20–25 minutes without damage so long as the cerebral circulation remained intact. This would allow sufficient time for resecting the stricture and restoring aortic continuity. On this basis the surgical treatment was devised and carried out, and what might seem to be the most formidable aspect of the operation—end-to-end suture of the aorta—was satisfactorily effected by two or three stay sutures and a Carrel type of continuous silk suture. The approach to the mediastinum was made through the big left fifth rib thoracotomy which Crafoord favours, and the aorta with the stricture and distended tortuous collaterals was dissected out. The enlarged and vigorously pulsating aorta just below the left subclavian was clamped and large collateral arteries temporarily secured, while below the stricture the narrow and relatively pulseless descending aorta was controlled. The narrowed area with the fibrous remnant of the ligamentum arteriosum was then excised. There was no difficulty in bringing the cut ends of the aorta together, and the suture was performed without any leaking, tension, or narrowing. The functional results of the operation were in all respects satisfactory. Hypertension was reduced and the circulatory efficiency of the lower limbs was considerably increased. The subsequent progress of the patients has been carefully observed, and tonoscillography before and after operation has provided some interesting information. There has been no suggestion

1. Crafoord, C., Nylin, G. *J. thorac. Surg.* 1945, 14, 347.

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of thrombosis or disturbance at the site of operation, though a careful watch will have to be kept for any abnormality appearing in later years. The conception and execution of Crafoord's attack on what has hitherto seemed an unassailable problem must be regarded as an outstanding achievement which opens up further possibilities in the realm of active therapy.

ANIMAL TESTS OF LIVER EXTRACTS

THE assay of the anti-pernicious-anæmia factor in liver fractions by a test on animals would obviously be preferable to the present method of testing on patients with pernicious anæmia, but repeated attempts to find a suitable test have failed, for two main reasons: first, it has not been possible to induce true pernicious anæmia in animals (the monkeys used by Wills and Stewart had a nutritional anæmia); and secondly, the tests have rested on a reticulocyte response which, at best, rose little above the limit of normal variation. Jacobson and Williams [1] at Cambridge, using splenectomised rabbits, are the latest to claim that they have answered the problem. In these animals the reticulocyte count rarely rises spontaneously above 3·5%, whereas injection of a liver extract known to be active for pernicious anæmia produces a rise to 5–6%; the smallest dose required to produce this response gives a measure of the activity. The presence of tricresol, or filtration through a Seitz pad, seriously interferes with the test. The results can be repeated, and as a rule comparable rises are obtained when an extract is given to several animals. The animals are not anæmic, and there is no evidence of any interference with normal erythropoiesis; the liver apparently stimulates normal erythropoiesis to greater activity; comparatively large doses have to be used and a negative result may indicate only low concentration of the anti-anæmic factor.

Liver extracts are known to contain many other substances besides the anti-anæmic factor, and Jacobson and Williams [2] have therefore attempted to find out how far the test is specific. Negative results with ascorbic acid, thiamine, calcium pantothenate, nicotinamide, biotin, and lactoflavin were obtained. Amino-acids, like histidine and a proprietary peptone, were likewise ineffective; iron produced a response only with a very large dose. Pterins were also tested, since these substances have been found in the pigment granules in the argentaffine cells of the alimentary tract, which appear to be connected with the production of the anti-pernicious-anæmia principle; leucopterin and xanthopterin, both natural and synthetic, were found to produce reticulocyte responses comparable to those obtained with liver extract in the splenectomised rabbits. But pterins are not known to be active in pernicious anæmia. Castle and others [3] have incubated xanthopterin with gastric juice, and the resultant substance had no demonstrable anti-pernicious-anæmia activity; there are, however, several references to the stimulant effect of pterins on erythropoiesis in animals with either nutritional or post-hæmorrhagic anæmia.

The test appears to be based on a fallacy, for, although some experiments indicate that the spleen may retard the release of cells from the bone-marrow, there is no real evidence that splenic extracts inhibit erythropoiesis; their use in human polycythæmia vera long ago accompanied onion extract and other treatments into oblivion. There remains the difficulty of obtaining a readably significant increase of reticulocytes in a non-anæmic animal—the difference between 3·5% and 5·0% may be statistically significant, but in practice it is only 15 reticulocytes in the 1000 cells counted, so exceptional care will be needed in deciding what is or is not a reticulocyte. Finally, the results with the pterins inevitably suggest that what is being estimated is not the anti-pernicious-anæmia factor but something else associated with it in an unknown manner. Jacobson and Williams will not be surprised if hæmatologists, after so many disappointments in this line, are not excited about their results. But the experiments are likely to be repeated, because the test may at least make it possible to select the batches of liver extract that are worth clinical trial.

1. Jacobson, W., Williams, S. M. *J. Path. Bact.* 1945, **57**, 101.
2. *Ibid*, p. 423.
3. Castle, W. B., et al. *Science*, 1944, **100**, 81.

TETANUS IN WAR AND PEACE

TETANUS, like gas-gangrene, is caused by an anaerobic sporing bacillus whose natural habitat is the bowel of animals and the spores of which persist in fæcal-soiled earth or dust. Both infections have been much more common in war than in peace, for the deep penetrating dirt-contaminated wound of the soldier seems to facilitate infection with the sporing anaerobes more than the bruises that accompany street or factory accidents. Indeed, the primary focus of tetanic infection may be so small as to be entirely overlooked and the conditions which favour germination of tetanus spores are still imperfectly understood. The spores may lie latent in the tissues for long periods, and *Clostridium tetani*, like other anaerobic pathogens, may be present in wounds without being associated with active infection. Sepsis and the toxins of other clostridia predispose to infection, but whether by lowering oxidation-reduction potential or by preventing phagocytosis of tetanus spores is still in dispute.

The incidence of tetanus in the first year of the 1914–18 war was 9 per 1000 wounded, a figure which after the routine use of prophylactic tetanus antitoxin was reduced to less than 1 per 1000. By contrast, the average annual number of fatal cases of tetanus in 1927–37 was 126·6, which with a case-fatality of 40–50% must mean that tetanus develops in a very small proportion of the accidents that occur every year. Yet the infection is so horrible and so difficult to treat in its florid state that every possible means of preventing it must be utilised in peace as well as in war. The use of tetanus toxoid in two doses of 1·0 c.cm. at an interval of not less than 6 weeks was shown by Boyd [1] to produce an active immunity, and at the outbreak of war in 1939 a high proportion of our Armed Forces had already been actively immunised against tetanus. Later a boosting dose of tetanus toxoid was given at intervals of 6–12 months after the primary inoculations, to maintain the antibodies at as high a level as possible, and in addition any soldier who was wounded was given 3000 units of antitoxin, repeated weekly for 4 weeks in those not actively immunised. That this policy had its due reward is demonstrated by Boyd's [2] analysis of figures for the African and European campaigns. Thus the incidence for the B.L.A. was only 6 per 100,000 wounded, which may be compared with a rate of 147 per 100,000 during the 1914–18 war. Higher rates (43 and 22 per 100,000) were recorded in the B.E.F. and M.E.F., but these infections mostly arose among the small percentage of men who were not actively immunised. The few cases of tetanus in men who received both primary and boosting inoculations seemed to be related to the failure in antibody production which occurs in a small proportion of people, and which probably justified the British injunction to give prophylactic doses of tetanus antitoxin to every wounded man. The success and safety of active immunisation against tetanus has impressed America, where this infection has always been a bogy from the days when it used to affect a fair number of Fourth of July revellers; and indeed deaths from tetanus have lately exceeded those from diphtheria in some American States. A combination of tetanus and diph-

1. Boyd, J. S. K. *J. R. Army med. Cps*, 1938, **70**, 289.
2. *Lancet*, Jan. 26, 1946, p. 113.

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theria toxoids is now being recommended in the U.S.A. for the immunisation of children, and in Britain a case has been made out for the active immunisation of agricultural workers against tetanus. In civilian practice reliance is usually placed on passive immunisation, although the prophylactic injection of tetanus antitoxin for accident cases in outpatient departments is not by any means a universal procedure.

Other forms of tetanus infection that often attract publicity are the postoperative, which is reckoned to constitute 5–10% of all cases, and the puerperal, which was recently the subject of inquiry by a committee of the Royal College of Obstetricians and Gynæcologists.[3] A high proportion of cases of puerperal tetanus follow abortion, and it seems reasonable to conclude that in many of them the infection was derived from unsterilised cotton-wool or cellulose wadding used as packs. These materials commonly harbour tetanus spores,[4] and the danger of unsterilised dressings was recently demonstrated by the astonishing report of 5 fatal cases of tetanus within 15 days among women who had been attended by the same abortionist.[5] Postoperative tetanus, most common after abdominal operations, has often been blamed on catgut or contamination from the bowel, but catgut has very rarely been found guilty, and in this country human carriers of tetanus spores are very uncommon.[6]

Another more likely source of tetanus infection is dust coming more or less directly from the street or from cultivated land. Kerrin[7] showed that domestic animals, and particularly dogs, are frequent carriers of tetanus spores, while Fildes[8] found the organism in 57 out of 79 samples of soil from cultivated fields. During the recent war many surgical theatres were protected with sandbags (often containing more earth than sand), and the possibility of anaerobic infection from these anti-blast devices was recognised. Last week (p. 152) Robinson, McLeod, and Downie reported two probable instances of dust-borne tetanus following surgical operation, one in a sanatorium where the windows of the operating-theatre opened on to grazing pasture (*Cl. tetani* was isolated both from the dust of the theatre and from the adjacent field); the other following an operation for hæmorrhoids where the catgut and dressings seemed to be satisfactory but the dust of the theatre taken 11 days after operation yielded toxigenic *Cl. tetani*. Examination of dust in 15 other operating-theatres yielded only one positive result—from the theatre adjacent to that in which the case of hæmorrhoids had been operated on. However, the positive findings indicate that dust must be regarded as a possible source for yet another infection (it has already been circumstantially incriminated in such diseases as scarlet fever, diphtheria, psittacosis, and, experimentally, tuberculosis), and measures must be taken to obviate this admittedly small but real risk of postoperative dust-borne tetanus. Operating-theatres are often not sufficiently isolated from much-trodden corridors. An air-lock should separate the theatre from such corridors, and new methods of ventilation are needed whereby a positive pressure of air is maintained in the theatre to prevent dust being aspirated into it. Dust-laying measures and the use of special theatre footwear should also be enforced. Where some of these recommendations cannot easily be put into practice, the surgeon should consider the wider use of prophylactic tetanus antitoxin, particularly after bowel and gynæcological operations.

3. Report of the Tetanus Committee, Royal College of Obstetricians and Gynæcologists, 1941.
4. Pulvertaft, R. J. V. *Brit. med. J.* 1937, 1, 441.
5. Bush, W. L. *J. Amer. med. Ass.* 1941, 116, 2750.
6. Kerrin, J. C. *Brit. J. exp. Path.* 1928, 9, 69.
7. *Ibid*, 1929, 10, 370.
8. Fildes, P. System of Bacteriology in Relation to Medicine, London, 1929, vol. III, p. 321.

FUTURE OF DERMATOLOGY

THE Royal College of Physicians of London last week published an interim report from its committee on dermatology,[1] who are here concerned with the medical staff, beds, and ancillary services needed for a comprehensive dermatological service. In a National Health Service, they point out, the demands made on dermatological departments will be greater than at present, for more patients will be referred to special departments by practitioners and more patients will want to have specialist advice. The provision they recommend is necessary, they believe, if standards of training—and presumably facilities for practice and research—are to be raised to a level that will give the best results in terms of health.

Assuming that, for purposes of organisation, the country will be divided into regions, whose dermatological centre will be in or attached to a university hospital (in London, a teaching hospital), the committee recommend that the head of each central department should be of professorial rank and his appointment a full-time one. His staff should include a dermatologist of reader status, two full-time registrars, and two resident medical officers, and a number of clinical assistants should also be appointed. The members of this department would be available for consultation with dermatologists throughout the region, and in certain circumstances by dermatologists of other regions. Facilities for pathological and biochemical investigation, and for physical therapy, must be to hand; a cadre of special personnel will be required for nursing, secretarial, and other duties; and either in the university hospital or in an easily accessible hospital there should be a block of 50 beds for dermatological cases. In addition, in every area of population of 100,000 or 250,000 persons a secondary dermatological centre should be established. This would be staffed by one senior dermatologist with assistants of the status of chief clinical assistants, the size of the staff depending on the density of population round any given centre and whether the area is industrial or rural. In sparsely populated districts small outlying hospitals could be used for collecting patients suffering from cutaneous diseases, and beds could be provided in one of each group of these establishments, which specialists from the secondary centres should visit when required. The committee think it important to have rehabilitation centres for skin cases, and they discuss the purposes the centre would fulfil—omitting, however, to mention the pioneer work done in this connexion by the Army during the war. They conclude their report by quoting a statement by Sir Archibald Gray that there are at present 85 part-time dermatologists of consulting rank in active work in England, Wales, and Scotland, and some 30 doctors in charge of skin clinics who are either general physicians or general practitioners. On the basis of the committee's recommendations the National Health Service will require no fewer than 250 dermatologists; and if some work only half-time the number will be larger.

Evidently the committee have been impressed by the paucity of the facilities for inpatient treatment for cutaneous diseases, and would like to see more centralisation than at present, especially in teaching hospitals. Undoubtedly by the use of modern methods of therapy, under controlled conditions, much of the gross wastage of drugs, dressings, and time which now occurs in many areas will be obviated, and much human suffering will be prevented; it has often been noted that while a man

1. The members are Lord Moran, P.R.C.P. (chairman), Dr. Henry MacCormac (vice-chairman), Sir Archibald Gray, Dr. H. W. Barber, Dr. A. C. Roxburgh, Dr. R. B. Mumford, Dr. G. B. Dowling, Dr. M. Sydney Thomson, Dr. R. T. Brain, Dr. J. T. Ingram, Dr. W. N. Goldsmith, Dr. J. E. M. Wigley, Dr. R. M. B. MacKenna, Dr. L. Forman (hon. secretary), Dr. B. C. Tate, and Dr. J. H. Twiston Davies.

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suffering from occupational dermatitis or infective dermatoses may attend as an outpatient for several weeks without noticeable benefit, he will rapidly get well when admitted to hospital and given the same treatment under controlled conditions. Further, by centralising dermatological units, economies will be made in dispensing and equipment, which are both heavy items in this specialty. Those who assess these recommendations will do well to remember, however, that, even where there are enough beds, the basic criterion in staffing (so far as doctors are concerned) is not, as is usually supposed, the provision of so many doctors for so many beds: of more importance is the ratio of medical staff to the average number of outpatients who have to be examined, treated, and "written up" each day. An insufficiently staffed outpatient department tends to degenerate into a dispensary service: teaching material and the time of doctors and patients is wasted, errors are made because of the pressure of work, and patients who should not be admitted are sent hurriedly to the wards because the outpatient physician has not the time to assess the cases properly. It may be suggested that because the committee recommend much better facilities for inpatient therapy this caveat will no longer be valid; but the majority of inpatients must always be admitted through the outpatient department, and the labours of this section of the hospital are not necessarily reduced because there are beds in which the patients can be put. It is to be hoped that in a later report the committee will also consider what is suitable accommodation. In this country the authorities (both municipal and voluntary) are apt to relegate "skins" to old wards in ancient buildings, not always recognising that artificial lighting is a severe handicap to diagnosis. Skin diseases usually have a depressing effect upon the patients, and this depression is intensified by gloomy surroundings. The teacher of any branch of medicine works at a grave disadvantage if he has to give his instruction in unsuitable conditions and in lecture-rooms which, in the graphic phrase of the engineers, are just "mock-ups."

Despite poor accommodation, deficiency of endowments and major benefactions, and the lack, until very recently, of a university chair, the work of British dermatologists has been much admired by their contemporaries abroad. The appointment of Dr. Percival to be professor of dermatology at Edinburgh, which is announced in our news columns, foreshadows, we may hope, more support in the future than our colleagues have generally received in the past.

JAKE PARALYSIS ON MERSEYSIDE

IN the last week of January there were numerous accounts in the daily press of a mysterious outbreak of paralysis in the Rhuddlan district of North Wales and on Merseyside. The first cases, which occurred at Rhuddlan early in December, were notified as poliomyelitis, but it soon became clear that the condition was a toxic peripheral neuritis affecting the muscles of the legs and feet, arms and hands, with an acute onset and a tendency to spontaneous recovery. Since many of the people affected were able to get about, and some even to do their work, the total incidence will be hard to estimate, but the present provisional figures are 21 cases in North Wales and 19 in Cheshire. On another page Dr. R. D. Hotston describes the clinical picture and reveals the cause of the ailment. This, it appears, is another example of orthotricresol phosphate poisoning. The first record of this was in the cases of "ginger jake," reported in the United States in 1930 in people who had drunk "soft" drinks flavoured with tincture of ginger which had been adulterated with tricresol phosphate to meet (or circumvent) the requirements of the *U.S.P.*, which specified a certain percentage of residue of specified solubility; 20,000 people were affected and many died.[1]

1. Burley, B. T. *J. Amer. med. Ass.* 1932, 98, 298.

It next arose in a steamship, the *Jean L. D.*, in a voyage from Durban to London in the autumn of 1937. Here 32 members of the crew of 34 were affected with gastro-enteritis followed 8–15 days later by motor paralysis of the lower limbs.[2] Reports of about 40 similar cases in Durban [3] led to the incrimination of soya-bean salad oil containing tricresol phosphate; this was the only article of food common to the Durban patients and those on the *Jean L. D.* In February, 1938, in Mauritius, there were 95 more cases, again ascribed to imported soya-bean oil contaminated with tricresol phosphate. How the poison reached the oil is still unknown, but it seems likely that the containers used had previously contained tricresol phosphate for industrial purposes.

A similar explanation seems likely in the present outbreak, for the tricresol phosphate has been traced to cotton-seed oil used in frying. This compound is used in the manufacture of cellulose lacquers, varnishes, &c., and being insoluble in water and non-volatile in steam is not easily removed from metal casks or drums. Users of second-hand containers should take note.

FUTURE OF DENTISTRY

THE inter-departmental committee on dentistry, under the chairmanship of Lord Teviot, have now issued their final report.[4] They begin by urging that an entry of 900 students a year to the dental schools should be achieved as quickly as possible. The attractions of a dental career should be brought to the notice of boys and girls through the headmasters of schools, by films, broadcasting, lectures, and the like, and by visits to dental schools and hospitals. In making the career more attractive the fundamental factor is the greater demand for dental treatment which will arise from public appreciation of the relation between dental disease and general health; this point was urged in the committee's interim report.[5] Public authorities can help recruitment by abolishing the discrepancies in remuneration between dentistry and kindred professions, and by providing adequate buildings and equipment and attractive conditions of service. In future, no suitable boy or girl should be deterred by lack of means from embarking on a dental training. The curriculum should be made as short as possible, compatible with a satisfactory standard.

In the committee's view all dental schools should be integral parts of universities, and should be distinct from, though closely associated with, their hospitals. This means that the extramural schools of Edinburgh and Glasgow should seek affiliation with their universities. New schools will have to be built, and old ones extended, to increase teaching capacity, and high priority should be given to such building. Staffing of dental schools should be generous enough to permit teachers to do research. A national scale of remuneration for dental teachers should be drawn up.

A Government grant of £1,250,000 is suggested for capital expenditure, with an annual sum of £150,000, rising to £300,000, to pay for building and equipment and meet the salaries of the increased number of teachers required. The committee urge that the profession should be governed by a separate Dental Council, coöperating with the G.M.C. More dental research is urgently needed, and the committee ask for generous support from the public and Parliament for an extended programme planned by the Medical Research Council.

AT the hall of the Society of Apothecaries of London on Tuesday, March 12, at 8 P.M., Lord MORAN will deliver a lecture entitled Into Battle.

2. Stock, P. G. Ann. Rep. Chief Medical Officer of Ministry of Health for 1938; appendix C, p. 189. In this appendix Dr. Monier-Williams suggests a simple test for tricresol phosphate in edible oils.
3. See *S. Afr. med. J.* 1942, 16, 1; *Bull. Hyg.* 1942, 17, 795.
4. Cmd. 6727, H.M. Stationery Office, pp. 60, 1s.
5. See *Lancet*, 1942, ii, 701.

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Special Articles

OUTBREAK OF POLYNEURITIS DUE TO ORTHOTRICRESYL PHOSPHATE POISONING

R. D. HOTSTON
M.B. Lpool
MEDICAL REGISTRAR, DAVID LEWIS NORTHERN HOSPITAL, LIVERPOOL

ORTHOTRICRESYL phosphate has been recognised as a cause of polyneuritis affecting only the motor system for over 40 years, having been first reported as the agent responsible for the typical syndrome in cases of pulmonary tuberculosis treated with phospho-creosote.

A later outbreak, called "ginger jake," occurred in the U.S.A. in 1930, due to the ingestion of adulterated samples of a "soft" drink known as "Jamaica ginger." Smith et al.[1] showed this to be due to orthotricresyl phosphate; later examination of the cases showed that anterior-horn cells and pyramidal tracts may also be involved. The use of apiol adulterated with orthotricresyl phosphate as an abortifacient has caused outbreaks in Holland and other European countries.

The first cases of orthotricresyl phosphate poisoning from use of cooking-oils were reported from Natal, where the toxic agent was found in soya-bean oil used for salads and cooking. Similar cases of paralysis due to orthotricresyl phosphate have been seen in Germany during the war, where workers have used adulterated fat substitutes for cooking.

Orthotricresyl phosphate is used in industry under the name of 'Lindol' as a plasticiser and in the recovery of phenol residues from gas-plant effluents.

PRESENT OUTBREAK

In November and December, 1945, patients with bilateral foot-drop presented themselves to various doctors and consultants in the Merseyside area, through whose kindness I have seen 17 of the cases.

The patients had a lower-motor-neurone paralysis without sensory changes, ranging from complete paralysis of all muscles supplied by the lateral and medial popliteal nerves to mere weakness of the tibialis anticus muscle on both sides. In addition there was usually a weakness of the extensors of the wrist and fingers and of the small muscles of the hand, particularly the adductor pollicis and the opponens pollicis. Knee-jerks were usually exaggerated, ankle-jerks absent, and the plantar responses unobtainable or flexor, and there was no ankle clonus. There were no other abnormal signs in the central nervous system except a transient unilateral palsy of the sixth cranial nerve in 1 case, following lumbar puncture.

Most of the patients gave a history of "gastritis" or "gastric flu" in early November, followed in about ten days by pains in the calves and anterior tibial compartments, accompanied or succeeded in a day or two by increasing weakness of feet, legs, and later hands. All 9 cases seen by me before the vital information was obtained were questioned regarding unusual foodstuffs (including a specific question re cooking-fats), or contact with plasticisers, cellulose, or other chemicals; but all denied any such association.

Lumbar puncture, when performed, produced a normal fluid or one with a slight rise in protein, with no increase in cells, and the pressure was normal. Blood examinations did not show anæmia, increase in reticulocytes, punctate basophilia, &c.

Vitamin-B_1 deficiency was excluded by the absence of other physical signs and the lack of response to large doses of the vitamin and the whole vitamin-B complex.

1. Smith, M. I., Elvove, E., Frazier, W. H. *Publ. Hlth Rep., Wash.* 1930, 45, 1703.

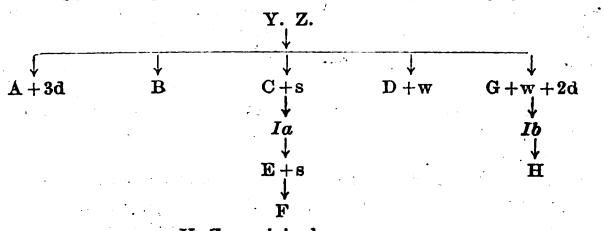
There was no evidence of other metallic poisons, diabetes, diphtheria (throat swabs were negative), or hæmatoporphyrinuria (no urinary changes). Though families were affected, there was no enlargement of the peripheral nerves as in progressive hypertrophic polyneuritis. Sulphonal, chloral, chloretone, sulphanilamide, and carbon monoxide were excluded by the history, and it seemed difficult to associate dinitrobenzol, tetrachlorethane, or carbon bisulphide with a clerk and young children, who were among the patients.

The diagnosis, therefore, by exclusion, came down to one of acute infective polyneuritis, the points against this being lack of any common factor between some of the cases, the absence of affection of proximal limb muscles and of cranial-nerve lesions, and the mildness of the *dissociation albumino-cytologique*.[2]

DISCOVERY OF CAUSE

On Jan. 22, 1946, a patient (C), not previously seen by me but whose adult son I had seen, came for examination. His history and physical signs were typical and, asked about cooking-oil, he replied that he had received such an oil from a friend (Y. Z.) at the end of October. Further questioning of patients previously seen revealed that they had all been given cooking-oil by Y. Z. either directly or indirectly. In following the hands through which this oil has passed further cases have come to light. In all cases the oil had been obtained in late October or early November; in some it had been used immediately, in others not until December; and most of those partaking of potatoes fried in the oil have been affected with paralysis (see table).

SCHEME OF DISTRIBUTION OF OIL AND CASES



Y. Z. = original source.
Ia and *Ib* = intermediaries not affected.
All other figures refer to cases of paralysis; w = wife, s = son, and d = daughter.

Samples of oil, proved to be of cotton-seed origin, remaining in the frying-pans of Mrs. D. and Mrs. G., have been shown by Mr. A. Grainger, A.R.I.C., senior technician to this hospital, to contain orthotricresyl phosphate, the analysis being confirmed through the kindness of Professor Roberts, City Analyst, Liverpool. Other examples of cotton-seed oil have been analysed and found to be free from adulteration; and, in view of the fact that Y. Z. has empty drums of all types at his disposal, it is postulated that the adulteration has taken place in one of these drums, but unfortunately this cannot be proved.

SUMMARY

The clinical picture seen in 17 cases of paralysis affecting the muscles supplied by the sciatic nerve, the intrinsic muscles of the hand, and the radial extensors is described.

Triorthocresyl phosphate was among the agents suspected as the cause and has been found in a cotton-seed oil obtained from a single source by all the patients and used as a cooking-oil.

2. Guillain, G., Barré, J. A., Strohl, A., cited by Brain, W. R. Diseases of the Nervous System, London, 1940.

LAWS passed last year in Sweden put men and women on the same footing in regard to holding government posts, except ecclesiastical appointments, and forbid employers to dismiss anyone on grounds of marriage, pregnancy, or childbirth.

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TRAINING OF GENERAL PHYSICIANS

AT a comitia held on Jan. 31 the Royal College of Physicians of London approved the following report from its council:—

Criteria for Consultants.—The council considered the criteria for consultants which had already been approved by the three Royal Colleges:

1. Consultants must have received their training at an approved hospital. Each college shall approve hospitals as suitable for training in its own branch of the profession and recognition shall be granted by the standing joint committee on the nomination of the individual college concerned.
2. Consultants shall have a minimum of five years' approved training and experience after qualification.
3. Consultants must hold an approved higher degree or diploma.
4. To be approved as a consultant, a candidate must hold or have held a recognised appointment to a hospital.
5. Consultants must not engage in general practice.

The council approved them in principle as applying to general physicians, but pointed out that training might be undertaken at more than one hospital. They also agreed that the consultant should have a minimum of five years' approved training and experience after qualification. This should be held to mean five years after registration. The council agreed that the M.R.C.P. examination should continue to be a test of the candidate's knowledge of general medicine. It was thought that it should not be taken earlier than one year after registration.

Training of Physicians in General Medicine.—The council agreed that it was essential that the required training for general physicians should be as elastic as possible within the general framework already agreed upon. They agreed that the following minima should be expected:

1. Candidates should hold a resident appointment in an approved general hospital for at least one year after registration. During six months of this period, the post held should be that of house-physician. The remaining six months should be spent in another junior medical appointment such as house-surgeon, house-physician in a special hospital, or resident in one of the special departments.
2. Candidates should hold a clinical appointment such as that of registrar or chief assistant for at least two years in an approved general hospital. During this time, he should be encouraged to undertake research work or to hold some additional appointment such as a demonstratorship in a department of physiology, anatomy, pathology, or biochemistry.
3. Candidates should spend at least one year in research or travel or in some non-clinical subject, such as physiology, anatomy, pathology, or biochemistry.
4. No rigid requirements should be laid down for the remaining period of training. A general physician should have some knowledge of the work of special hospitals such as sanatoria, children's hospitals, mental hospitals, &c., and appointments in such hospitals should be recognised. A period of six months spent in general practice might be allowed to count as part of the five years' training.

The council agreed that there should be no rigid order for holding these appointments, and they emphasised that the times suggested were minimal and not maximal.

PHYSIOTHERAPY AT HOME

DISTRICT nurses, especially Queen's nurses, have a high reputation for ability and skill, and like all people who are good at their job they are always finding ways of doing it even better. In Liverpool the Queen Victoria District Nursing Association is adding a mobile physiotherapy unit to its resources, so that paralysed or other patients unable to attend hospital outpatient departments, yet needing massage, ultraviolet light, infra-red ray, or other forms of light or electrical treatment, can receive them in the warmth and comfort of their own homes. This, the first unit of the kind to be provided by a city in connexion with its district nursing service, was launched by the Lord Mayor of Liverpool, on Jan. 15, from the Central Home of the association. If it proves a success other units will be put on the road. The association is affiliated to the Queen's Institute of District Nursing, and is staffed entirely by Queen's nurses.

Medicine and the Law

Abortion for Probable Defects in the Child

THE suggestion has lately been made in America that when a woman contracts rubella in the early months of pregnancy abortion should be induced to prevent the birth of a defective child. This raises an interesting legal point.

One cannot get away from the fact that abortion is a statutory felony under the Offences against the Person Act, 1861. It is thereby declared to be a felony if (1) a woman with child unlawfully takes a drug or uses an instrument to procure her own miscarriage, or (2) anybody else unlawfully gives her a drug or uses an instrument for that purpose. The fact that the woman desires to terminate her pregnancy is, as Macnaghten, J. told the jury in R. *v.* Bourne in July, 1938, quite irrelevant. It was held in R. *v.* Sockett (1872) that the woman herself can be convicted of "being present, aiding and abetting" if she consents to the administering of the drug or to the use of the instrument. The word "unlawfully" is, of course, all-important. It was not, it is understood, included in the original indictment of Mr. Bourne; the judge at trial allowed the indictment to be amended by its inclusion. In 1929 the Infant Life (Preservation) Act introduced an amendment of "the law with regard to the destruction of children at or before birth"; in the interests of distraught mothers it created the new statutory offence of "child destruction." There was an important proviso—"no person shall be guilty of an offence under this section unless it is proved that the act which caused the death of the child was not done in good faith for the purpose only of preserving the life of the mother." This, it was apparently thought by the judge in the Bourne case, did no more than state the common law under which the termination of a pregnancy is justified if bona fide undertaken to save the mother's life. Such an operation, Macnaghten, J. considered, in effect would be lawfully and not unlawfully performed and therefore would be outside the Act of 1861. The acquittal of Mr. Bourne, satisfactory and proper as it was, prevented the Court of Criminal Appeal (and possibly also the House of Lords) from reviewing the law of abortion. It may be that the report, when it comes, of Lord Simon's inquiry into population will give fresh impetus to a re-examination of the law. Meanwhile we have it established by Mr. Justice Macnaghten's summing-up to the jury that the burden is on the prosecution to prove beyond reasonable doubt that the surgeon did not operate in good faith to preserve the mother's life, and, further, that those words "for the purpose only of preserving the life of the mother" are to be construed "reasonably." They do not mean that he operates because the mother's life is in instant danger. They protect the surgeon if continuing pregnancy would mean that the "patient became a physical and mental wreck." What would have made the patient a physical and mental wreck in the Bourne case was largely, it may be presumed, the fact that her child would have been a living reminder of the shameful violence with which the mother had been treated. If a woman can be assured that her child is certain to be born with some terrible deficiency, it might well have the same effect on her mind.

We are here in that field of law where borderline cases are to be expected and where everything depends on the view taken by a jury of the facts of a particular case. All one can say is that the termination of a pregnancy is still prima facie a felony, but that juries are often sympathetic.

THE Central Medical War Committee announces that the following have resumed civilian practice:—

Mr. ARTHUR F. M. BARRON, F.R.C.S.E., 8, Bright's Crescent, Edinburgh, 9.
Mr. J. I. MUNRO BLACK, F.R.C.S., 87, Jesmond Road, Newcastle-upon-Tyne, 2.
Dr. JAMES FLIND, D.P.M., 115, Harley Street, London, W.1.
Mr. A. WALLIS KENDALL, M.S., F.R.C.S., King's College Hospital, Denmark Hill, London, S.E.5.
Dr. EMANUEL MILLER, 79, Harley Street, W.1.
Mr. D. C. RACKER, F.R.C.S.E., M.R.C.O.G., 26, St. John Street, Manchester.
Mr. A. RADCLIFFE, F.R.C.S., 15, Wimpole Street, W.1.

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Reconstruction

THE SALARIED SPECIALIST

WORK AND PAY

THE first annual general meeting of the Association of Municipal Specialists, formed a year ago, was held in London on Jan. 25, with Dr. Horace Joules, the president, in the chair, and was attended by 75 of the 284 members. The following memoranda drawn up by the council were confirmed.

SALARIES

1. The clinical career of a specialist employed whole-time by a local authority should afford prospects no less satisfactory as regards status, remuneration, &c., than those of an administrative career. In revising the Askwith scale, scales of remuneration for consultants and specialists common to all types of hospitals and medical services should be negotiated.

2. The salary scale should apply to all consultants and specialists (including physicians, surgeons, obstetricians and gynæcologists, pædiatricians, tuberculosis officers, psychiatrists, pathologists, radiologists, and anæsthetists) satisfying approved criteria.

3. Where, in addition to acting as a specialist, there are administrative duties (e.g., medical superintendent of a hospital), there should be additional remuneration.

4. Whole-time specialists should not be debarred from teaching, lecturing, or examining, and retaining fees for so doing.

5. Salary should be reckoned as total remuneration, including the value of emoluments, for the purposes of the salary scale.

6. The minimum commencing salary should be £1500 per annum, rising by £100 to a maximum of £2500, due allowance being given to status and past experience on first appointment.

7. It is desirable that there should be an "efficiency bar," the details of which would have to be settled.

8. Specialists should have adequate professional assistance and for this purpose there should be chief assistants (although in many departments they might be called by other names). Their salary should be £800 per annum, rising by £100 to £1200 (including the value of their emoluments).

9. The specialists and chief assistants should be assisted by an adequate number of senior and junior house-officers.

10. In any case in which a specialist is in receipt of a salary at a rate less than that which would have been payable had the scale been in force and applied to him during the whole period of his service, the salary shall be increased to an amount according with the scale.

11. In the matter of superannuation, added years (not less than five in number) shall be granted, in view of the long period of academic and hospital training which of necessity precedes any appointment as a specialist and which at present usually prevents the attainment by specialists of the maximum superannuation benefit based on years of service. Adequate provision should be made for the widow and dependents. All superannuation schemes should be interchangeable.

12. Whole-time specialists should be entitled to six weeks' annual leave and adequate study-leave with full pay. The six weeks' annual leave should be exclusive of normal off-duty time and public holidays or their equivalent.

13. The above figures are based on 1939 standards of living.

STAFFING

It is recognised that there must be great variation in the staffing of specialist departments owing to the different circumstances of local-authority hospitals, but the following scheme is put forward as demonstrating the principles which the association considers should be used as a guide in the staffing of such departments.

In a general hospital of about 1000 beds (with beds in special institutions needed for their service), there should be:

Medical Department

Beds: 240 acute, including children's cots; 160 chronic.

Staff: 4 full-time physicians, including 1 pædiatrician; 4 chief assistants; 4 senior house-physicians; 4 junior house-physicians (pre-registration).

Surgical Department

Beds: 240 acute; 160 chronic.

Staff: 4 full-time surgeons; 4 chief assistants; 4 senior house-surgeons; 4 junior house-surgeons (pre-registration).

The full-time physicians and surgeons will vary in seniority although on the same salary scale, but will each be in charge of beds. One or more of the physicians or surgeons may devote most of his time to a special branch of medicine or surgery.

Obstetric and Gynæcological Department

Beds: 100 lying-in; 40 antenatal; 20 isolation; 80 gynæcological.

Staff: 3 full-time specialists in obstetrics and gynæcology (1 of whom might have administrative duties); 6 chief assistants; 6 resident obstetric officers; 1 pædiatrician, who should be one of the physicians of the hospital.

The specialists of this department should control the ante- and postnatal treatment of the patients attending it.

Ear, Nose, and Throat Department

Beds: 30, and 30 children's cots.

Staff: 1 E.N.T. surgeon, who should spend half his time in the department (the other half to be spent in a similar department at another hospital); 1 chief assistant, whole-time.

Tuberculosis Department

Beds: 240 pulmonary tuberculosis; 60 non-tuberculous chest.

Staff: 3 full-time tuberculosis physicians; 3 chief assistants; 3 house-officers.

The tuberculosis department should be an integral part of the tuberculosis service of the local authority, and have in its care the tuberculosis beds in a sanatorium.

Pathological Department

Staff: 3 full-time pathologists (1 morbid anatomist, 1 serology, bacteriology, and hæmatology, and 1 biochemist), 1 of whom might have administrative duties; 3 chief assistants (1 for each department); and 3 junior assistants, not considered as specialists for the salary scale.

In addition to the routine pathological work, the pathologists should undertake the responsibility for post-mortem examinations estimated at 600–800 a year.

Radiodiagnostic Department

Staff: 2 full-time radiologists, 1 of whom might have administrative duties; 2 chief assistants; 2 junior assistants, not regarded as fully qualified specialists.

Anæsthetic Department

Staff: 4 full-time anæsthetists; 4 chief assistants (some resident).

It is presumed that the house-officers would play some part in giving anæsthetics.

The *psychiatric staff* has not been included, since this matter is being dealt with by another association.

The *fever hospital staff* are likely to need very considerable modification in the near future owing to the wider use which is being made of their services, but it is suggested that for a 600-bedded fever hospital there should be: 2 full-time physicians (1 of whom might have administrative duties), 1 full-time physician employed as an epidemiologist, 4 chief assistants, and house-officers.

Public Health

Shortage of Accommodation for Chronic Sick in Kent

THE county medical officer for Kent (Dr. A. Elliott) and the public assistance officer reported to the county public assistance committee on Jan. 23 that owing to the shortage of nursing and domestic staff the number of chronic sick on the waiting-list had risen from 606 on Jan. 1 to 697. It was stated that in the eight public-health general hospitals 314 chronic sick were being treated in the general wards, representing 24% of the patients so accommodated, and that this figure could not be increased, because of the difficulty of training student nurses. In the eleven establishments for the chronic sick, of which two were under the control of the public health committee, approximately 1800 patients were being treated. During the past five months two public-assistance establishments for the chronic sick containing some 280 beds had had to be closed owing to the impossibility of obtaining nursing and domestic staff.

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The position had been reached whereby the admission of the chronic sick had virtually ceased. The only beds becoming available were those vacated by the death of patients, and in a number of cases the shortage of staff meant that some of those beds had to be taken out of commission in order that the remaining staff could care for the patients. The waiting-list consisted of three main groups:

(1) Patients for whom admission was urgent because no-one was available to give them care and who would starve if accommodation were not found. On occasion days have passed before beds could be found for patients in this group.
(2) Patients who were living alone but who had some intermittent attention. The waiting period for patients in this group was about three months.
(3) Patients who required admission to an institution but who could be provided with more or less continuous care and attention in their homes. The waiting period for patients in this group is approximately fourteen months.

Cases illustrating the hardship and suffering which were being inflicted on the community by the shortage of nursing and domestic staff were quoted. It was stated that of the patients on the waiting-list 94 were living alone and 41 were living in lodgings; 5 patients were suffering from gangrene and 26 from incurable cancer.

An appeal has been made to the Ministry of Health for a nursing unit of some 50 Service personnel for six months in order that Leybourne Hospital for the chronic sick may be reopened to meet the immediate needs.

INFECTIOUS DISEASE IN ENGLAND AND WALES

WEEK ENDED JAN. 26

Notifications.—Infectious disease: smallpox, 0; scarlet fever, 1420; whooping-cough, 1329; diphtheria, 428; paratyphoid, 3; typhoid, 1; measles (excluding rubella), 907; pneumonia (primary or influenzal), 1450; cerebro-spinal fever, 76; poliomyelitis, 6; polio-encephalitis, 2; encephalitis lethargica, 2; dysentery, 358; ophthalmia neonatorum, 45. No case of cholera or typhus was notified during the week.

The number of service and civilian sick in the Infectious Hospitals of the London County Council on Jan. 23 was 1078. During the previous week the following cases were admitted: scarlet fever, 77; diphtheria, 33; measles, 18; whooping-cough, 25.

Deaths.—In 126 great towns there were no deaths from enteric fever, 1 (0) from measles, 1 (0) from scarlet fever, 9 (2) from whooping-cough, 7 (1) from diphtheria, 66 (8) from diarrhœa and enteritis under two years, and 273 (35) from influenza. Figures in parentheses are those for London.

Manchester reported 17 deaths from influenza, Birmingham 16, Leeds 12, no other great town more than 8.

The number of stillbirths notified during the week was 218 (corresponding to a rate of 30 per thousand total births), including 39 in London.

On Active Service

CASUALTIES

DIED

Captain BASIL REID CAYGILL, B.M. Oxfd, R.A.M.C.
Captain CHRISTINE MARY EDMONDS, M.B. Birm., R.A.M.C
Captain CLARENCE WILFRED O'DONOGHUE, L.M.S.S.A., R.A.M.C.

WOUNDED

Captain E. D. M. ANDERSON, R.A.M.C.
Captain I. H. BAUM, M.B. Lond., R.A.M.C.
Captain R. D. CHALMERS, M.R.C.S., R.A.M.C.
Lieutenant J. D. DEVITT, R.A.M.C.
Captain G. R. EVANS, M.C., R.A.M.C.
Captain R. S. GIBSON, M.B. Glasg., R.A.M.C.
Captain H. W. LEES, M.R.C.S., R.A.M.C.
Captain J. H. MCBEATH, M.B. Glasg., R.A.M.C.
Major F. MURRAY, R.A.M.C.
Captain J. M. B. POOLEY, M.R.C.S., R.A.M.C.
Captain A. C. PORTEOUS, M.R.C.S., R.A.M.C.

AWARDS

K.B.E.

Major-General EDWARD PHILLIPS, C.B., C.B.E., D.S.O., M.C., M.B. Durh., late R.A.M.C.

C.B.E.

Brigadier R. K. DEBENHAM, O.B.E., M.D. Camb., F.R.C.S., R.A.M.C.
Brigadier G. K. FULTON, M.B.E., M.B. Glasg., R.A.M.C.
Brigadier G. B. JACKSON, M.B. Dubl., I.M.S.
Brigadier H. G. WINTER, M.C., M.R.C.S., late R.A.M.C.

FIRST BAR TO D.S.O.

Colonel MALCOLM MACEWAN, D.S.O., O.B.E., D.F.C., T.D., M.B. Glasg., R.A.M.C.

D.S.O.

Lieut.-Colonel W. M. E. ANDERSON, M.D. Dubl., R.A.M.C.
Lieut.-Colonel ALFRED COWIE, M.B. Aberd., R.A.M.C.
Lieut.-Colonel J. R. KERR, M.B. Camb., I.M.S.
Lieut.-Colonel E. H. P. LASSEN, L.R.C.P., R.A.M.C.
Lieut.-Colonel M. H. SUMMERS, T.D., L.R.C.P., R.A.M.C.

O.B.E.

Lieut.-Colonel D. M. BAKER, M.B. Camb., R.A.M.C.
Lieut.-Colonel K. J. DUNLOP, M.B. Edin., R.A.M.C.
Lieut.-Colonel H. V. INGRAM, M.B. Durh., R.A.M.C.
Lieut.-Colonel R. T. JOHNSON, M.B. Camb., F.R.C.S., R.A.M.C.
Lieut.-Colonel A. E. KINGSTON, M.R.C.S., I.M.S.
Lieut.-Colonel J. McI. D. MCINTOSH, M.B. Aberd., R.A.M.C.
Lieut.-Colonel W. H. WOLSTENHOLME, M.B.E., M.R.C.S., R.A.M.C.

M.B.E.

Lieut.-Colonel G. V. CHAPHEKAR, I.M.S.
Lieutenant C. R. NARAYAN, I.A.M.C.
Captain G. A. CRAIG, M.B. Belf., R.A.M.C.
Major J. V. CRAWFORD, M.B. Lond., R.A.M.C.
Major WILLIAM DRUMMOND, M.B. Edin., R.A.M.C.
Major FRANK EVANS, M.C., M.B. Camb., F.R.C.S., R.A.M.C.
Lieut.-Colonel J. F. HESLOP, M.B. Manc., F.R.C.S., R.A.M.C.
Captain A. D. A. MACONOCHIE, M.R.C.S., I.M.S.
Captain ALLAN MCDIARMID, M.B., R.A.M.C.
Major M. P. ALI, I.M.S.
Captain C. E. S. MYERS, M.R.C.S., R.A.M.C.
Major H. G. PAGE, M.B. Edin., F.R.C.S., R.A.M.C.
Captain J. L. G. PINTO, M.B., I.M.S.
Captain EDGAR RENTOUL, M.B. Glasg., R.A.M.C.
Major J. P. SCRIVENER, M.R.C.S., R.A.M.C.

M.C.

Major W. J. RAMSAY, M.B. N.Z., R.A.M.C.
Captain E. G. W. CLARKE, B.M. Oxfd, R.A.M.C.
Captain LESLIE WILLSON, M.B. Edin., R.A.M.C.
Captain T. L. W. MCCULLAGH, M.B., I.M.S.
Captain VADIVELU CHITTER, M.B., I.M.S.
Captain DONDIPAD RAMANTH, I.A.M.C.
Lieutenant GANGAPRASAD, I.A.M.C.

MENTIONED IN DESPATCHES

R.N.V.R.

Surgeon Lieutenant R. A. DE K. GLOVER.

I.A.M.C.

Lieut.-Colonels. — J. REIDY, G. V. CHAPHEKAR.
Major A. E. R. COOMBES.
Captains.—M. P. U. V. RAJA, M. L. PANJANI, M.B.E., *Captains—continued* VENKATAPATHI RANGASWAMI.
Lieutenants.—C. R. NARAYAN, P. JAGANNATHAM, M. A. JABBAR, S. S. ROY.

R.C.A.M.C.

Colonels.—G. R. FORBES, E.D., C. A. MCINTOSH.
Lieut.-Colonels.—W. K. BICE, W. H. P. HILL, L. E. R. LUCKEY, J. S. MCCANNEL, O.B.E., H. S. MITCHELL.
Majors.—L. W. BASSETT, T. G. FYSHE, D. K. GRANT, I. S. MACLEAN, J. F. NICHOLSON.
Captains. — W. M. BYERS, M. L. HARLEY, MAXWELL LERNER, M.C., R. M. LEVINE, H. G. METCALFE, R. F. M. MEYERS, W. A. REED, J. G. W. SWANSON, W. H. WHITE.
Lieutenant EDGAR SHAW.

MEMOIR

IT is now known that Squadron-Leader E. W. B. GRIFFITHS, who was previously reported missing, died on Feb. 15, 1942, while a prisoner-of-war in Japanese hands. He graduated M.B. at Otago in 1928 and after holding a resident appointment at the Auckland Hospital came to this country, where he took the F.R.C.S.E. in 1935 and the D.O.M.S. three years later. Before the war he held the appointment of ophthalmic and aural surgeon at the Memorial Hospital, Hastings, New Zealand. During the war Dr. Griffiths served with the R.A.F. as ear, nose, and throat specialist to the Malaya Command.

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In England Now

A Running Commentary by Peripatetic Correspondents

AT a recent trial, the learned judge rebuked a medical witness for using the term "anxiety state." "One of those clichés," he said. "I suppose you mean the man was worried." No doubt our poor colleague would have preferred to point out that anxiety state is not merely a synonym for worry, but it takes some courage—or shall I say audacity?—to argue with the Bench. Why, a couple of years ago the word "sibling" was derided as "one of those meaningless psychological terms," yet the speaker refrained from exhorting His Lordship not to expose his ignorance!

Medical jargon is one of the outstanding stock Aunt Sallies and is even in the running with kippers, mothers-in-law, seaside apartments, and the rest of the red-nosed comedian's repertoire. There is ample scope for facetiousness over our polysyllabic phraseology and anybody with an elementary classical knowledge can ridicule the hybrid constructions and the absurd revelations of etymological analysis. Even in our own private circle we are inclined to laugh at ourselves; witness the attempt to select or construct a word which properly connotes what we call venereology. And although at first I resented it, I am now reconciled to having patients referred to me, the neurotic specialist.

"A severe contusion of the infraorbital integuments with marked extravasation of blood and ecchymosis of the surrounding cuticular tissue which was in a tumefied state. There was considerable abrasion of the cuticle." You can bet pretty confidently that whenever a new textbook on forensic medicine appears, this alleged description of a black eye will be the example of how one should not talk when giving evidence. During the last twenty-five years I have written to the *Lancet* and *British Medical Journal* three times when I encountered a resurrection of this imperishable monstrosity of circumlocution to inquire for its origin. I first heard it nearly half a century ago when I was a little boy. Such an elaborate construction could never have been produced on the spur of the moment; it smells too much of the lamp. I can imagine some wag pruning and polishing it and keeping it in cold storage until an opportunity arose, but so far I have had no response to my request for the identity of the said wag. It is high time that those who chide us for our periphrasis found some substitute example which is easier to remember and more plausible.

Other professions and occupations have their technicalities, yet nobody criticises them. We don't admonish the mathematician because he talks of logarithms or exponential curves, and invite him to use plain English. Once I sat in company with a couple of engineers and of their conversation I could not understand two words in ten; yet I attributed my inability to my ignorance, not to their eclectic affectation.

* * *

Doctor's letter to Hospital Physician: "Night sweats. Please investigate."
Hospital Physician to Patient: "*Do* you sweat at night?"
Patient: "Dreadful"
Hospital Physician: "What is your job?"
Patient: "Night stoker."

* * *

At the back of the bookcase I have found a bacteriological scrap-book whose first entries are of 1896 and the last of 1902. Before the war the compiler used to visit the laboratory regularly, an old man very curious after the new knowledge of others and far too prone to belittling his own. In spite of his long connexion there are few records of him in this laboratory which he founded and financed in the spring days of bacteriology; the part-authorship of an "Atlas of Bacteriology" to which no-one now refers (to the loss of everyone); a minute and archaic autoclave; and the book of lecture notes which he brought back from Paris when he had attended a course at the Institut Pasteur. Alas, by that time the eponymous director no longer lectured and it was young Roux who taught, but our visitor had seen and spoken to the man who had so inadvertently founded a new science.

I am afraid, Mr. Editor, that it is your contemporary that furnished most of the cuttings. They concern bacteriology only; they are not indexed; one misses the comments in the correspondence next week. But in manner and matter they do not differ much from the published articles of today. The subjects? I quote at random: "The sterilisation of milk and its effect on the nutritive values"; "The bacteriology of infantile diarrhœa"; "The antitoxin treatment of diphtheria"; "Serum diagnosis"; "The epidemiology of malaria"; "The parasites of smallpox and chickenpox" (artefacts I fear in this case).

I have not consulted the index for 1945 but I suspect that all these subjects would appear there. But—with one honoured exception—the names would be different. And what names! The scrap-book reads like the Court Circular of Valhalla: Koch, Manson, Ross, Wright, Haffkine, Martin, Houston, Celli, Cantlie, Delépine, &c., &c., &c. (for once I see point in the tripetition). Unlike those heroes of the older Valhalla who needed bards to tell their stories, these have written their own, in plain English and without using the word "evaluate." But, like the old old tales, their stories are powerful in dispelling any ὕβρις that may overcome a bacteriologist of today after digesting the banquet of reading matter that showers through his letter-box. We have not yet convinced our legislators that a sterile milk compensates for some small loss in nutritive value. Infantile diarrhœa is one of the commonest hardy perennials of Adam Street, and no praise is ever given to the woman who, with a bit of muslin and a dozen beads, made a milk-jug fly-proof. "Serum diagnosis" is a handier phrase than agglutination reaction, and I wish I had had Celli's article on malaria to read in the Arakan.

History merges into mythology and I would like to have known more personalia of the heroic age. Did they wash with alcohol and soap and water before they shook hands with a visitor? Or did they light their pipes at the bunsen, or hum *Dolly Gray* as they worked at night alone? No hint appears in all these papers of the cramped quarters, the improvised apparatus, and meagre recognition enjoyed by these men among whom the compiler was not the least. Before the haze of time covers the view, someone should write the story of the anni decem mirabiles of bacteriology, 1896–1905.

* * *

My young friend Cash in the village stores, who figured in these columns about a year ago, is even thinner and is more often away ill. She was taking down my order a few days ago and concurrently lamenting our diet. I tried to comfort her by saying that things would probably be better later this year. "If we're not all invalids first," she sighed. In her mind it is a race with time.

* * *

If plain living and high thinking go together, then I must be well above the mental average, for so far I have seen no improvement in the amount or quality either of rations or luxuries. Even the belt that I am advised to tighten is getting a bit frayed. Usually I do not notice such mundane things, but there are occasions when my proud citadel gets painfully assaulted, particularly when I see a borrowed magazine from the United States. On the advertisement pages, which seem to make up eighty per cent. of the publication, are all kinds of goodies, friendly to tongue and innards, beautifully tempting in all their natural and tinned colorations, and lacking only in availability. There, from the glossy pages, they stare back at me—lobster, lettuce, and salad cream; fruits of extreme delicacy and bloom; bronze-tinted hams and streaky bacon slices; port and sherry to tempt even a teetotaller; orange and lemon drinks to satiate the most dehydrated abstainer.

"What's the matter, Jack?" says my wife, hearing me smack my lips, "Are you hungry?" And before I have time to answer this disastrous reminder of my newly acquired condition she continues, "It's sausages today; very badly needing using up, I think, but all I could get."

I have no real grudge against those fine folk of the United States, their President, or their constitution; but I do wish they would not upset my morale like this. During the war I occasionally got an American medical journal with an article or two painted black by the censor (it took me quite a time to work the black off); isn't

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there now as great a need for that black paint on advertisements likely to cause despondency in ex-occupied or ex-lease-lent countries?

* * *

At the hospital the other day I was examining the throat of a little girl of five who was having persistent hæmorrhage after tonsillectomy, when she exclaimed: "You should put me on M. & B.; that's what Mummy does." And this is exactly what an increasing number of mummies are doing—wheedling a box of sulphapyridine tablets (the most modern prefer sulphathiazole) out of their doctor and thereafter distributing them to the family for any ailment from measles to asthma, via coryza, much as their grandmothers handed out brimstone and treacle and their mothers castor oil. The remarkable thing is that so few children come to any harm from the practice.

Parliament

ON THE FLOOR OF THE HOUSE

MEDICUS, M.P.

LARGE measures are jostling each other for precedence in the parliamentary programme. On Jan. 30 the second reading of the Coal Nationalisation Bill was carried by 359 to 182 and an opposition proposal to refer it to the House of Commons as a whole, sitting as a committee, was lost by 356 to 181. It was then 9.30 P.M.: the debate had already lasted the whole of Tuesday and the financial resolution was debated until 2.57 A.M. on Thursday morning. On Thursday afternoon the Minister of Health moved the second reading of the Acquisition of Land Bill which speeds up compulsory acquisition for factories, houses, or whatever may be required, and the Government obtained the second reading at 9.12 P.M. by 241 votes to 98.

Legislation for the current week includes the National Insurance Bill, which gives us all security for 4*s*. 11*d*. a week, and a measure to control and direct investment. The National Insurance Bill was in the main an agreed coalition measure but it is a massive document, and Mr. Eden, as acting leader of the Opposition, asked if more time could not be given for members to consider the Bill, and Mr. Clement Davies, leader of the Liberal Ten, backed him up. Mr. Davies urged that the House should not be saddled with so heavy a burden so soon after the coal debate. At first Mr. Morrison dug in his toes, but finally he agreed to give an extension of time to discussion of the financial resolution. One member referred to Mr. Morrison as "the right honourable and totalitarian member" and was duly rebuked by the Speaker. Another M.P. complained that we have had a lot to absorb in two weeks, and Mr. Morrison felt "bound to warn the hon. and gallant member that he will have a lot more to absorb before we are done."

Perhaps in this atomic age the temperature of political controversy is rising. The Bevin-Vyshinsky bouts at UNO have been high-spirited and perhaps alarming, and in Parliament the fights of Government and Opposition are bound to become more and more intense. But it is doubtful whether this will much affect the proposals for a National Health Service. This also belongs to a large extent in the class of measures about which agreement exists. The plans of the Medical Planning Commission of the B.M.A. and other representative medical bodies went a long way towards a National Health Service, and an idea which seemed revolutionary before 1939 now finds itself in tune with the spirit of the time. A National Health Service will enable Great Britain to take an effective share in the structure of the new international health organisation which will be part of UNO.

QUESTION TIME

National Health Service

Sir H. MORRIS-JONES asked the Minister of Health why, in his recent interview with some representatives of local authorities concerning his proposals for hospital administration in his forthcoming National Health Bill, they were forbidden by him to consult their associations or to divulge his proposals.—Mr. A. BEVAN replied: The Government's proposals for a National Health Service will be published in the proper manner, by the submission of a Bill to Parliament. Before settling final details of that Bill, I am seeking advice on various points from expert representatives from local government and other fields. I am not asking them to commit the local authorities or other bodies to any particular proposal, and my discussions with them must obviously be confidential.

Approved Societies

Mr. H. E. GOODRICH asked the Minister of National Insurance if he would give an assurance that it is his intention to seek the assistance of the voluntary friendly societies in the administration of his scheme during the transitional period, even though he did not intend to use them as an integral part of his scheme; and for how long he anticipated seeking the advice of friendly societies for this purpose.—Mr. JAMES GRIFFITHS replied: I contemplate that there will be a transitional period during which the change to the new system of health insurance will take place by stages. This is inevitable owing to the magnitude and complexity of the operation and has the advantage that it will enable any arrangements that may be decided upon for transfer of staffs of approved societies to be made without the risk of a breakdown of administration at the date of transfer. During the transitional period some use will have to be made of the machinery of the approved societies generally. The extent and manner in which this can best be done is one of the matters at present being discussed with a committee representative of all classes of approved societies, and until these discussions have made further progress I cannot say what form these arrangements will take or how long they will last.

Invalidings from the Services

Mr. W. N. WARBEY asked the Minister of Pensions how many men and women discharged from the Services as unfit since September, 1939, had been refused a pension; and how many of these were placed in medical category grade I when they entered the Service.—Mr. WILFRED PALING replied: In all some 680,000 men and women have been invalided from the Forces since 1939, but no statistics are available as to their medical category on enlistment. An award of pension has been made in about 285,000 cases. All invalidings are automatically notified to my department irrespective of whether the individual desires that his entitlement to pension should be considered. In fact in well over half the cases where no award of pension was warranted the person concerned has at no time made or inferred anything in the nature of a claim.

Silicosis and Pneumoconiosis

Replying to a question Mr. E. SHINWELL, Minister of Fuel and Power, stated that from 1940 to 1944 there were 514 certificates of death and 5054 certificates of suspension in respect of silicosis and pneumoconiosis to coalminers.

Deaf-aids

Mr. R. ASSHETON asked the President of the Board of Trade whether, in view of the high quality of certain deaf-aids made in the U.S.A., he would consider remitting the customs duty on these instruments in order to bring their selling price in this country within the reach of those with moderate means; and whether he would also consider if some arrangement could be made between this country and the U.S.A. for the mutual exchange of such articles as deaf-aids, artificial limbs, eyes, &c., without the payment of any duties on either side.—Sir STAFFORD CRIPPS replied: Deaf-aids produced in this country are available at prices which in general compare favourably with those charged by overseas manufacturers. The type which the right hon. gentleman has in mind is required for a very small proportion of cases of deafness. I have considered the information as to the price at which it is available to purchasers in this country and I do not feel that I can advise the Chancellor of the Exchequer that a remission of import duty would be justified.

Grants for Medical Students

Sir E. GRAHAM-LITTLE asked the Minister of Labour how many medical students had received grants from the Further Education and Training Scheme since its inception; what was their total amount; and whether, as the need for qualified medical practitioners would become greatly increased under the proposals for future health services, he would make grants in proportion to that need.—Miss E. WILKINSON replied: Up to Jan. 24 130 awards have been made for courses of training in medicine. The grants provide for maintenance and the cost of fees, but it is not possible, without undue labour, to give the total cost for this type of award in particular. All applications from men and women who appear to be eligible for awards under the scheme will be very sympathetically considered.

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Letters to the Editor

DESIGN OF RAILWAY CARRIAGES

SIR,—I should like to congratulate your peripatetic correspondent for his brilliant and timely article in your issue of Jan. 19, and you for your leading article drawing attention to it. As one who has had to travel much in railway carriages I can underline from painful experience every word that your correspondent says. I refer particularly to the symptoms arising from being sealed up, as he says, in a small unventilated box with nine other bodies, of whom six are uttering products of imperfect combustion in clouds. He goes on to describe the symptoms to which these products give rise—headache, tremors, palpitations, upset of bowel rhythm, amblyopia, and extrasystoles. I have suffered all this, and indeed it takes me two or three days usually to recover from the railway trip to London. Your peripatetic correspondent's case has been neatly summarised by the American investigators Wells, F. W., and Wells, M. W.:

"... under conditions of crowding in enclosed rooms we are breathing one another's nasopharyngeal flora as we once drank each other's intestinal flora in our water supplies, and the consequences of such practices become a study in sanitary science."

This question calls urgently to be brought to the notice of the Ministry of Transport. It will be small comfort to get a free doctor under the National Medical Service to cure illness which, by reasonable ventilation arrangements, could easily be prevented.

Cardiff. J. GREENWOOD WILSON.

CONTROL OF SONNE DYSENTERY

SIR,—I read with surprise some of the comments and conclusions of Dr. Vollum and Dr. Wylie in their paper of Jan. 19 on control of Sonne dysentery with succinylsulphathiazole.

They say: "Fairbrother (1944), however, found both drugs [succinylsulphathiazole and sulphaguanidine] to be ineffective in controlling the convalescent carrier-rate in Sonne dysentery." This is not quite accurate. My paper indicates that, while these drugs proved effective chemotherapeutic agents in most cases, they were not invariably successful, and both failed to clear a relapsed case and two persistent carriers. These results were considered to be disappointing, particularly in view of the claims made for succinylsulphathiazole; and the following comment was made: "While these drugs are useful for this purpose, they have not proved entirely successful, and it is hoped that a more effective compound will eventually be produced."

Later Vollum and Wylie quote me as suggesting that "when this state is reached, the organisms become extremely difficult to eradicate, partly because of anatomical inaccessibility and possibly also because of an acquired resistance to sulphonamides." It is, however, clearly stated in my paper that "evidence was not obtained that the persistence of infection was due to the development of sulphonamide-resistant strains of *Bact. sonnei*."

Vollum and Wylie conclude that "reinfection rather than persistence of the causal organism is the explanation of the apparent failures reported by some workers using succinylsulphathiazole to bring about a bacteriological cure." Reinfection was undoubtedly responsible for the persistence of the organisms in the cases they describe, for convalescent cases (schoolboys) were allowed to mix freely with cases excreting *Bact. sonnei*. This simple explanation, however, cannot be accepted for the failures in my series. Here the patients were adults, under Service conditions, who were in hospital during treatment. Three cases proved particularly refractory and continued to excrete *Bact. sonnei* for many months. These were sporadic cases isolated in siderooms in different wards where there were no other patients with Sonne dysentery:

CASE A.—A.T.S. officer. Received a course of 63 g. sulphaguanidine, and after 4 days' interval gave four negative results, but later became strongly positive. A course of 63 g. succinylsulphathiazole was then given. After three negative results the fourth specimen yielded one colony of *Bact. sonnei*, and later specimens gave a profuse growth.

CASE B.—Italian prisoner-of-war. Received 57 g. sulphaguanidine. After 4 days' interval gave three successive negative results, one positive, then two negative, and finally became persistently positive. After 63 g. succinylsulphathiazole similar results were obtained. Sulphaguanidine enemata were next tried, without success. Later sulphaguanidine was given by mouth and per rectum in a total dosage of 200 g., but also without success. This course was later repeated with increased doses, but again *Bact. sonnei* was isolated from the fæces within a fortnight of the cessation of treatment.

CASE C.—Officer. Resisted successive treatment with sulphaguanidine enemata, succinylsulphathiazole (81 g.), and sulphaguanidine orally and in combination with enemata.

Factors other than reinfection were responsible for the persistence of *Bact. sonnei* in these and other cases, but the exact nature of these factors was not determined.

Present methods of controlling bacillary dysentery are unsatisfactory, and the disease is widespread throughout the country. One reason for this is that there is no adequate criterion for clearance of infection. I therefore recommend that twelve successive negative examinations of the fæces should be required for clearance of any individual concerned with handling food. It is also advisable that, so far as possible, cases should be isolated until free from infection; this applies particularly to children and food-handlers. The results given by Vollum and Wylie indicate that convalescent cases were reinfected by schoolboys excreting *Bact. sonnei*, who obviously provided a fruitful source for the dissemination of the organism.

These recommendations present a difficult administrative problem, but vigorous measures must be adopted if dysentery is to be controlled.

Manchester Royal Infirmary. R. W. FAIRBROTHER.

EXPLORATION OF MUSCLE

SIR,—In your leading article of Jan. 19 (p. 96) it is stated that "In life, all muscles are in a state of 'tone,' which means that the myosin molecules of every muscle fibril are all the time being switched open and shut several times a second." A publication by Sherrington (*Brit. med. J.* 1931, i, 207) is quoted as evidence for this statement. In fact, no such statement appears in the work referred to, and moreover recent work by Hoefer (*Arch. Neurol. Psychiat.* 1941, **46**, 947) and others makes it clear that no motor unit action potentials can be recorded from relaxed muscles. The so-called "tone" exhibited by a normal inactive muscle is probably due both to its elastic properties and the tension of the tissue fluid within its sheath.

Department of Human Anatomy, Oxford. G. WEDDELL.

*** The word "tone" was used to mean the partial contraction of reflex posture. In the article cited, Sherrington emphasises the ubiquity of postural activity. Dr. Weddell is right, however, to point out that in sketching the background for a picture of the myosin molecule under conditions of subtetanic and tetanic contraction, we should not have referred to "all" muscles, and "every" fibril as continuously active.—ED. L.

BOOKS FOR YUGOSLAVIA

SIR,—The doctors of Yugoslavia are very short of modern British medical literature, having received almost none since the war started. They are most anxious to make good this shortage, and on a recent visit to Belgrade I promised those who asked me—and many did—to do what I could to help.

If any of your readers can spare any standard works or series of periodicals (odd one's or two's are of little value) published in the United Kingdom since September, 1939, and would send them to me, I will undertake to have them forwarded to Yugoslavia through military channels, by kind agreement of the Director-General of Army Medical Services, Sir Alexander Hood.

A gift of this kind would be much appreciated and may help to increase the friendship and good will between the two countries. It is suggested that contributors write inside each volume "The gift of (name and address)." This may lead to the development of individual friendships.

HAROLD C. EDWARDS.

King's College Hospital, Denmark Hill, London, S.E.5.

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PALATABILITY OF 85% NATIONAL WHEATMEAL BREAD

SIR,—The recent report on the conference called to advise the Government on its post-war flour policy[1] has raised once more the question of the acceptability by the British public of bread made from flours of relatively high extraction. Little reliable information on this subject is available, and some observations made in the Royal Air Force early in the war may therefore be of interest.

Before the baking of white bread in Britain was forbidden in March, 1942, the Medical Directorate of Air Ministry had appreciated the high nutritive value of 85% "national wheatmeal" bread, and had insisted that a large proportion of the bread supplied in the Royal Air Force should be national wheatmeal. Indeed, between October, 1941, and March, 1942, approximately half of the bread served was 85% national wheatmeal, the remainder being the 75% extraction white bread. A unique opportunity was thus provided for the study of the relative acceptabilities of the two types of bread.

At each of three R.A.F. stations in East Anglia the following simple test was made in the airmen's mess at the tea meal during the first week of March, 1942. Equal quantities of white and national wheatmeal breads were placed on the serving counter, and as the men filed past they took the variety of bread they preferred; the type of bread chosen by each man was recorded. The following precautions were taken to ensure that the tests were as fair as possible: (*a*) the men did not realise that tests were being carried out, since the observers remained hidden throughout, and the method of serving the bread in each mess was similar to the method normally employed; (*b*) the men always had apparently equal access to each bread; (*c*) both breads were equally well baked and fresh; (*d*) the 85% national wheatmeal bread was of satisfactory quality, and contained about 0·7% crude fibre. The results of the tests are given in the table.

MEN'S CHOICE OF BREAD AT THREE R.A.F. STATIONS

Bread	—	Station 1	Station 2	Station 3	Total
White	No.	439	419	393	1251
	%	*63·2*	*55·9*	*54·8*	*57·9*
National wheatmeal	No.	256	210	295	761
	%	*36.8*	*28·0*	*41·1*	*35·2*
Some of each	No.	0	120	29	149
	%	*0*	*16·0*	*4·0*	*6·9*
Total men observed		695	749	717	2161

Although there was a tendency for the proportion of men choosing the different breads to be similar in the three messes, there were statistically significant differences between these proportions, showing that factors other than those anticipated influenced the men's choice. The exact method by which the bread was served was one such factor. At station 1 servings of bread (two slices), each with an equal-sized portion of margarine, were placed at random on the serving table, so that although each person could choose either white or national wheatmeal bread he could not choose one slice of each. At station 2 the slices of bread were mixed and separated from the margarine, so that a choice of either or both types of bread could be freely made. At station 3 each type of bread was placed on a separate tray, the margarine being served separately. It became apparent that the position of the trays relative to the margarine influenced the men's choice, in spite of the fact that the trays were only 2 feet wide and were placed close together side by side. When the tray with national wheatmeal was nearer the margarine, 48·5% of 508 men observed chose only national wheatmeal, and when the tray with white was nearer only 23% of 209 men chose national wheatmeal; the likelihood of this difference occurring by chance is less than 1 in 1000.

From the above results it is apparent that the white bread was the more popular in all messes but the difference was not great. There certainly was no overwhelming prejudice against national wheatmeal bread since 35·2% of the men chose only this bread and a further 6·9% took it as part of their bread ration. Had the prejudice been strong the changing of the positions of the trays in the tests at station 3 would not have influenced the men's choice as much as it did. A further indication of the indifference of many of the men to the type of bread they ate was obtained in another test, not here recorded, in which the men could choose servings of either of the two types of bread, with portions of margarine of rather unequal size placed on the bread. In this test the men tended to choose their bread not according to whether it was white or national wheatmeal, but rather according to the size of the portion of margarine on the bread.

The tests described above were carried out with satisfactory samples of 85% national wheatmeal bread, containing 0·7% crude fibre. It was the constant experience in the Royal Air Force during 1941 and the early part of 1942 that poor-quality national wheatmeal breads, darker and containing larger amounts of crude fibre, were less acceptable to the men.

R.A.F. Institute of Pathology and Tropical Medicine, Halton. T. F. MACRAE.
SIMON YUDKIN.

1. Cmd. 6701. 1945. See *Lancet*, 1945, ii, 784, 789.

GOOD BUT NOT GOOD ENOUGH

SIR,—In your comments on the Summary Report of the Ministry of Health (Dec. 29, 1945, p. 856) you refer to the 934 deaths from diphtheria during the year ending March 31, 1945, as "all these preventable deaths." Seeing that the Minister of Health admitted (*Lancet*, Nov. 17, 1945, p. 650) that in the five years 1940–44 there had been 118 deaths from diphtheria in fully immunised children under 15, it would be of particular interest to know what suggestions you have to make as to how these 118 "preventable" deaths could have been prevented.

Camberley, Surrey. M. BEDDOW BAYLY.

*** The Summary Report itself (p. 5) says: "These deaths were preventable." This is true; for, though present methods of immunisation do not ensure complete protection for the individual, yet if a sufficiently high proportion of a population is immunised diphtheria disappears; Canada and the U.S.A. can now supply numerous examples of this disappearance. It should also be noted that the figures given by the Minister are those returned by the local authorities, and comprise persons immunised at any time in their lives.—ED. L.

PROSTATECTOMY

SIR,—The recent letters which have appeared under this heading did not appear to call for comment from me. They were, in the main, armchair criticisms. Mr. Newell (Feb. 2), albeit with but a short experience of the operation, has done me the honour of a favourable preliminary report, and asks a question which I should answer. I have now performed some 87 retropubic prostatectomies, and have notes of transient œdema of the penis in 8. This phenomenon, which subsided promptly in each case, is undoubtedly due to ligature of the deep dorsal vein of the penis, but the free anastomosis between the deep and superficial venous systems of the organ ensures complete recovery.

Mr. Wilson Hey (Dec. 22) deserves well of all thinking surgeons for his insistence on aseptic methods in prostatectomy. He has, as yet, few disciples in his demand for immediate operation in every case of retention, acute or chronic. To subject some of these old men in a state of cardiovascular decompensation to immediate operation cannot but lead to disasters. Many of these patients require preliminary general preparation. The trend of modern medicine is towards team-work, and few physicians or surgeons of experience will subject their patients to a major operation irrespective of renal or cardiovascular function. We must preserve a sense of proportion. Whilst agreeing with Mr. Hey on all possible asepsis, I fail to see how his transvesical operation, which entails trauma of the bladder and extensive resection of the trigone, can be preferred to the less mutilating extravesical procedure, with its more complete hæmostasis. Mr. Hey has quoted the late Hugh Young. I can find no reference in the writings of this great American urologist to his having employed the retropubic approach in the living. We

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have disproved, I think, that the approach is narrow and cramped. I have today removed without any difficulty a prostate weighing 355 grammes. I would ask Mr. Hey to try the approach, and perhaps he will be converted, like others not unacquainted with his operation. I believe that he will find the access more direct, and the postoperative course easier.

Does Mr. Morson (Jan. 19) still believe that the suprapubic tube is the handmaiden of sepsis? If so, why does he continue to employ it in such a high proportion of his cases, when he too very properly stresses asepsis?

To Mr. Bailey (Jan. 12) and his hankering after the osteoplastic trapdoor, I would say: please try the retropubic approach. Why open both doors of the garage to get *his* bicycle out? I can find descriptions by Beer (1924) of 12 cases of periostitis of the pubis following suprapubic cystostomy, and since then 17 cases have been published, the last 3 in 1941; so, bearing in mind that it is a form of surgical failure, and therefore unlikely to be reported as often as success, it cannot be so very uncommon.

London, W.1. TERENCE MILLIN.

ERYSIPELOID

SIR,—Dr. Barber and her colleagues draw attention (Jan. 26) to 7 cases of this rare condition resulting from wounds incurred while handling beef or rabbit during the later months of 1945. Dr. Singer (p. 124) reports a case following the handling of a dead pig. During this same period a woman was referred to the skin department at the South London Hospital with the report that she was the third case of the same type recently seen. The three patients were workers in different fish shops, and all gave histories of injury by a fish-bone. In all of them, raised red patches had developed at the site of the injury, which was painful, and had spread. The patches bore a resemblance to erysipelas, but the borders were not so definitely demarcated; lymphangitis was present; the lesions did not suppurate. No pathological investigation was made.

It is of interest that all these 11 cases were seen within a few months at hospitals in London. Barber et al. suggest that the present increased incidence of this affection may be due to meat which in times of plenty would have been condemned being passed for human consumption. This hypothesis is supported by recent reduction from time to time of the Jewish ration because rabbis have not passed meat released for general distribution.

London, W.1. ELIZABETH HUNT.

SIR,—In the two articles in the *Lancet* of Jan. 26, pp. 124 and 125, the condition is referred to as rather rare, but it was fairly common in my last practice in Dorset, and responded very rapidly to gr. 7½ sulphanilamide every 4 hours for 24 hours. The condition would usually clear up in 48 hours on this treatment, but occasionally it might recur two days later, when a second course completed the cure.

Cirencester, Glos. R. E. HOPE SIMPSON.

ORGANISERS AND THE GROWTH OF BONE

SIR,—Referring to your annotation of Jan. 5, p. 23, I realise that it may have been difficult to summarise in one column a subject which I needed several papers to approach. But if it was to be attempted at all, there was surely no need to be inaccurate, make misleading or amazing statements, and misquote or disguise my opinions.

You write in one sentence: "Fibroblast cells gathered round the transplanted cubes . . .—a 'typical induction phenomenon' is Lacroix's comment"; which is of course ridiculous. My text read: "The formation of this bony ring is a typical example of an induction phenomenon," which is quite different. Furthermore the meaning of this observation cannot be grasped if the reader is not told beforehand of the presence of the same bony ring in the normal ossification groove, a fact overlooked so far and which should have been mentioned.

You write: "alcoholic extracts of the long bones" where I said "from the cartilaginous epiphyses of the long bones." You refer to Blum's experiments as being concerned with injections "of kidney phosphatase" whereas Blum's very words (*Lancet*, 1944, ii, 75) were "phosphatase was prepared from the *long bones and kidneys.*"

I laid stress on the high degree of organisation shown by the results of my injections, this being in sharp contrast with the low degree of organisation obtained up to now in the production of ectopic bone. You seem to suggest that if I am to admit the participation of an organiser in these highly specialised processes, I might as well be led to admit that an ill-fitting shoe organises blisters. Is this a proper way to present an author's opinion?

Now to come to the best example of scientific objectiveness. Before even seeing my illustrations, the full report still being in the press, you foresee that "none of these results will surprise those familiar with the experimental production of ectopic bone: gall-bladder and urinary epithelium will do as much."

I might go on like this. Need I say more to convince your readers—who deserve better consideration—that, if they happen to be interested in the subject indicated by the title, they had better *not* rely on the annotation but should refer to the following original publications? [1]

P. LACROIX.

Institute of Anatomy, University of Louvain, Belgium.

*** We are sorry that Professor Lacroix feels that the twofold digestion of his work—in *Nature* and in our annotation—has done him an injustice; we felt that, inadequate as the presentation must be, his empirical results were of sufficient importance to justify an immediate mention. We are still by no means convinced that he is justified in describing the phenomena he has put on record as "inductions," and we still feel that particular mention should have been made of the rôle of phosphatase in the formation of ectopic bone. But we heartily endorse Professor Lacroix's recommendation that those who are interested in the subject should read his original papers. It is to encourage this that our annotations are written.—ED. L.

WEIL'S DISEASE

SIR,—May we make the following request to clinical bacteriologists in Great Britain? We should be greatly obliged if all who have been carrying out the serological diagnosis of Weil's disease would let us know how many cases they have diagnosed during the years 1940 to 1945, and (if quite easy) the number of sera they have tested for this purpose.

Sir William Dunn School of Pathology, University of Oxford. A. D. GARDNER. J. A. R. WYLIE.

TUBERCULOUS RHEUMATISM

SIR,—Like Dr. Wilfrid Sheldon (Jan. 26) I have been interested in tuberculous rheumatism. The cases outlined below were seen in five years among 750 personal cases of active pulmonary tuberculosis.

CASE 1. *Arthralgia.*—A boy of 6 with a strong family history of rheumatic fever had debility and cough in October, 1945. During November he had a sore-throat, and developed fleeting pains (without swellings) in the right ankle, knee, and hip. The erythrocyte-sedimentation rate (E.S.R.) was 20 mm. in one hour. He was admitted to hospital for subacute rheumatism, but fever persisted despite salicylates; he had a positive Mantoux (1 : 10,000), and on radiography a large shadow was seen around the right hilum. Observation confirmed the diagnosis of tuberculosis.

Sheldon stated that a fleeting pericarditis without an accompanying arthritis may indicate recent tuberculous infection, but said he had not seen any such instances recorded.

CASE 2. *Pericarditis and arthralgia.*—A girl of 15 was admitted with acute pericarditis going on to effusion, complicated by collapse of the left lower lobe of the lung. She had pain in the left shoulder for one night only. The condition was treated as acute rheumatic fever. Abnormal signs disappeared and the fever subsided, but tachycardia persisted. Five months after admission râles were heard at the left apex of the lung, and tubercle bacilli were recovered from the gastric juice.

CASE 3. *Chronic rheumatism.*—A woman, aged 19, had had pains in her hands and feet for two years, and, for a few

1. *Mém. Acad. R. Belg.* 1943, **2**, fasc. 2; *Arch. Biol., Paris*, 1945, **56**, 185; *Anat. Rec.* 1945, **92**, 433; *Arch. Biol., Paris*, 1945, **56**, 351; *Nature, Lond.* 1945, **156**, 576; *Bull. Acad. R. Belg* (1946) in the press.

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months, swellings of the joints of the hands, knees, and ankles, simulating rheumatoid arthritis but with more movement and less pain than in typical rheumatoid arthritis. Râles were heard at the left apex, and skiagrams showed recent active infiltration. E.S.R. was 80 mm. in one hour.

The association of true acute rheumatic fever and tuberculosis was mentioned by Sheldon; and I have no doubt that they can coincide or follow one another closely.

CASE 4.—A boy of 18 was in hospital for three months with acute rheumatic fever. Two months after discharge cough began, and four months later widespread phthisis was present.

Of the 750 cases of active pulmonary tuberculosis, 6 had unequivocal signs of mitral stenosis and 21 others gave convincing evidence of true rheumatic fever earlier in life. This incidence of rheumatic heart disease in pulmonary tuberculosis is not less than that in the general population.

St. Andrew's Hospital, Bow, London, E.3. ELI DAVIS.

A DIFFERENT KIND OF MATRON

SIR,—I read your annotation of Jan. 19 with much interest. The Royal Victoria Infirmary is to be congratulated on its enlightened advertisement for a matron, and nurses will follow the experiment with keen interest. I do not agree with your interpretation of it, however, and would suggest rather that the intention of the hospital board is to invite applications from those possessed of qualifications in addition to State registration as a general-trained nurse. Surely the appointment of a lay woman would have an adverse effect on the recruitment of nurses in that the chances of advancement might be thus curtailed. The General Nursing Council, I believe, insists that matrons of training schools must be qualified nurses. It is surely unfair to instance Florence Nightingale as an example of what can be done by one untrained in nursing. Since she was responsible for the inauguration of training schools later it would have been difficult for her to attend one before she went out to the Crimea. She was also one of the outstanding women of history, possessed of gifts far above even the higher levels of intelligence. Her experience made her appreciate the necessity for schools of nursing, and she was the pioneer of all that has since been accomplished in this direction.

Be that as it may, the main consideration is undoubtedly the personality of the individual; I agree whole-heartedly that certificates without the power to use the knowledge acquired are of little use. A matron should be an intelligent, charming, progressive woman with poise, sound judgment, and humour, possessed of a knowledge of the world and the people who live in it. Her life should be full professionally and socially and her interests wide enough to embrace matters outwith her own particular sphere. Such a one would welcome any help from outside which would increase the efficiency of her staff. It is only when hypocrisy, love of power, and narrow-mindedness are allowed to flourish that we find petty jealousy and many attendant evils entering into the scene. The unworthy parts of the existing system must be enucleated with a wise hand if it is to fulfil its function, and if necessary the system must be re-created to meet modern conditions. This is much more likely to be well done by one who has had first-hand experience of existing conditions, since a layman, with the best will in the world, cannot appreciate the complexities of nursing.

I know that there are women in the nursing profession today with high ideals and the power to put them into effect, and I hope that the Royal Victoria Infirmary will be fortunate in appointing one able to take advantage of the splendid opportunity for service which it offers.

A SCOTTISH MATRON.

SIR,—Like you I read the advertisement of the Royal Victoria Infirmary with great interest. In my book, *A New Deal for Nurses* (1939), I suggested that the divergent aims of training school and hospital might be reconciled by putting responsibility for nursing care in the hospital and the education of the nursing students under one head relieved of purely administrative duties. I hinted that it might be necessary to go outside the nursing profession to find an educationist to run an experimental school of nursing. This I am still inclined to think; but I must confess I should not like to see a matron—or, as I would prefer to call her, superintendent of nurses—with a medical qualification.

One of the greatest obstacles, if not the greatest, to advancement of nursing to professional status is the nurse-doctor relationship, which more often than not is interpreted to mean that nurse must always defer to doctor. Florence Nightingale did nurses a great disservice by inculcating a subservient attitude to doctors which she by no means always practised herself. It would have been much better to say to the nurses: "obey at the bedside but argue it out afterwards." I suspect that more patients have been ill served by her charge to nurses never to do anything for the patients without the leave of the doctors than have suffered by the inclination of nurses to take too much upon themselves.

To return to the matron. Until nurses are surer of themselves and their professional status a doctor-matron who made a success of the job would always be thought of as having succeeded because she was a doctor. There would always be the suspicion that she could achieve more than a mere nurse.

I agree that it is the woman who counts; and it may be that the right woman, whatever her qualifications, would help nurses to decide what their indispensable contribution to the health service is, and make it of such a quality that there could be no more talk of competition and subservience, but only of advance with a common aim—the good of the patient.

G. B. CARTER.

PS.—I don't think it is true to say that Florence Nightingale was not a trained nurse. Certainly she was not S.R.N.: she would have been horrified at the idea, being opposed to registration of nurses. But she did see to it that she got the best training in bedside nursing that the world knew about, and she did what the Royal Victoria Infirmary house-committee are going to let their matron do—go round and have a look at what others are doing.

HOUSE-OFFICERS' SALARIES

SIR,—In 1886 my father paid ten guineas for the privilege of holding an appointment as house-physician at his parent teaching hospital. In 1916, at the same hospital, I held similar appointments for ten months, for part of that time unqualified, board and lodging being my sole remuneration. My sole income for the whole of that period was the occasional guinea for assisting a senior at an operation. The student with self-respect does not allude to his poverty, although his shabby clothes and excuses for not taking part in communal activities may reveal his straits to the observant senior.

The Ministry of Health, in the Emergency Hospital Scheme, instituted more adequate pay for house-officers and even a modest salary for the senior student employed in that capacity. I hope that, with the cessation of the scheme, teaching hospitals will not revert to this disgraceful form of sweated labour. Some students are thereby prevented from holding such posts, and others retain a feeling of ill usage. Certain non-teaching and special hospitals with a national reputation use this as a means of obtaining the services of the ablest graduates for the smallest wage—a scandal of which boards of management should be ashamed.

London, W.1. PEARSE WILLIAMS.

LOCAL ANÆSTHESIA OR ANALGESIA

SIR,—There is a growing tendency to use the term *analgesia* to describe the state produced by the local injection of such drugs as procaine. As the absence of pain is the effect desired, it may be argued that *analgesia* is an apt description. On the other hand, a condition in which there is lost more than just the sense of pain may indicate the use of the word *anæsthesia*.

It is ultimately use and wont that determine the meanings of words. The humanists may vote for *anæsthesia*: would they be correct in doing so?

Dagenham, Essex. ROBERT FORGAN.

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VITAMIN-B DEFICIENCY AND NERVOUS DISEASE

SIR,—In his letter of Nov. 24 Dr. Fitzgerald Moore mentions his continued acknowledgement of my early contributions to this subject and refers to his article of 1937 [1] as an example of this acknowledgement. A reference to it shows that Moore mentions my work thus:

> "In 1926 Wright described in Sierra Leone a disease which he later (1930) termed the A and B avitaminosis of Sierra Leone."

This is inaccurate, in that I did not describe the disease until 1927, and I first termed this syndrome "Disease due to A and B avitaminosis in Sierra Leone" in my original article published in Sierra Leone Annual Medical and Sanitary Report for 1927, later reproduced in the *West African Medical Journal* for October, 1928.

In Moore's letter he associates the name of Stannus with "the same line of thought" presumably as my own in 1927, and pays tribute to the correctness of Stannus's views on the ætiology of the general condition expressed in Stannus's 1911–12 papers. A study of these papers shows that Stannus was chiefly concerned in demonstrating that maize was not a causative factor of pellagra. There was no line of thought on the ætiology of the syndrome Stannus described which even suggested it was due to a vitamin deficiency.

I am not satisfied that vitamin-A deficiency has no connexion with the disease I described. Most experienced clinicians do not diagnose clear-cut syndromes due to a single vitamin deficiency, and the fact that riboflavine and vitamin A occur most abundantly in protective foods should make for cautiousness in denying an A-deficiency factor in the so-called ariboflavinosis syndrome.

Moore does not think that I described a retrobulbar neuritis. I would remind him that I described a visual defect curable by dietetic means—a defect which he thought was a retrobulbar neuritis. I however recorded [2] that I had examined a large number of cases of defective vision associated with the syndrome I described and had not found any observable pathological changes in the optic disks in the majority of fairly recent cases associated with the epithelial lesions of the disease.

R. H. Elliot, in *Tropical Ophthalmology* (1920), states that in 1895 Kono published six cases of beriberi, associated with amblyopia, central scotoma, and contraction of the visual field, but presenting no fundus changes. Three years later Komoto discovered that the cause of the amblyopia and of the central scotoma was a retrobulbar neuritis. Yamamoto seems to have been the first (1903) to draw attention to an atrophic condition of the temporal disk in these cases. Kagoshima, in 1918, made an anatomical examination of five cases in which beriberi scotoma was present: he found in all of them a distinct and limited atrophy of the fibres in the outer section of the optic nerves. Moore confuses the issue when he says that "nutritional" retrobulbar neuritis is not due to beriberi though it may be associated with it, and at the same time insists on the administration of vitamin B (the whole of the B-complex) in its treatment.

The study of food-deficiency disease has been much retarded by attempts to define certain syndromes as due to a single vitamin deficiency, and also by the attitude of the pellagrologists to anyone attempting to describe a food-deficiency syndrome which manifested any signs or symptoms occurring in pellagra.

Sierra Leone. E. JENNER WRIGHT.

*** We have submitted this letter to Dr. Fitzgerald Moore, who writes: "On questions affecting priorities I have nothing to add to my previous letter. It is apparent also that Dr. Wright and I are not in full agreement on the ætiology of this syndrome. It seems unnecessary, however, to present my views (*J. trop. Med. Hyg.* 1939, **42**, 109; 1942, **45**, 129) again to your readers. I am content to leave the matters at issue to the balanced opinions which inevitably arise in the course of time."—ED. L.

1. *Lancet*, 1937, i, 1225.
2. *Brit. med. J.* 1936, ii, 707.

Obituary

JOHN FRANCIS HARPIN BROADBENT

BT., M.A., D.M. OXFD, F.R.C.P.

THE death of Sir John Broadbent on Jan. 27 in his 81st year breaks a long family association with St. Mary's Hospital. His father, the great Victorian physician Sir William Broadbent, F.R.S., joined the honorary staff in 1864, and had 36 years of active teaching there. The son continued his work both in the wards and in the medical school, of which he was dean from 1910 to 1920.

Educated at Rugby and Oxford, John Broadbent qualified from St. Mary's in 1891 and after holding numerous junior appointments became assistant pathologist and curator of the museum. He had to wait until 1905 for the vacancy to which he was appointed as physician to outpatients. Meanwhile he had gained experience in various special fields and had been made assistant physician to the London Fever Hospital. In a presidential address to the Medical Society of London in 1932, which appeared in these columns, he summarised the results of 25 years' observations at that hospital and elsewhere on the establishment of immunity in infectious fevers, especially diphtheria and scarlet fever. Infections, among them tuberculosis, always had his close attention. Most of his writings, however, concerned the heart. In 1896, with his father, he produced the work on *Heart Disease* which was described in its day as "unquestionably one of the best works that has been published on that subject." For the later editions he was largely responsible; but gradually the pressure of other work increased, and the book was not issued again after Sir William Broadbent's death in 1907. He became physician to the Hampstead General Hospital and consulting physician to the King Edward VII Sanatorium at Midhurst, in whose foundation his father had been keenly interested.

Press Portrait Bureau

But it was St. Mary's that profited most by his loyalty. As dean he worked wholeheartedly for the school and the students, who found him a good friend, and he overcame many of the obstacles of a difficult period. On May 1, 1916, the school made medical history as the first in London to open its doors to women students, at that time overflowing from the London School of Medicine for Women. For the success of this innovation Sir John Broadbent deserves much of the credit. In the hospital itself his younger colleagues could testify to his generosity in help, advice, and opportunities in the wards. As teacher he had none of the showman's art, and his talents did not appeal to the many; but he was a sound physician intent on his duty both to patients and students. Courteous and kind, and having himself a high professional standard, he disliked assumption and pushfulness in any form. He was never happier than in his family circle and in the country at Wendover where he made his home. Fortunately too, St. Mary's was not very far away from Lord's. From youth onwards he had been a devotee of rowing and cricket, and he belonged both to Leander and the M.C.C.

Sir John Broadbent married in 1895 the daughter of Dr. G. P. Field, formerly dean of St. Mary's. They had three daughters and a son, William Francis, who succeeds to the baronetcy. Dr. Walter Broadbent, consulting physician to the Royal Sussex County Hospital, Brighton, is his younger brother.

ON Feb. 1 M. L. Abrahamson, J. B. Ryder, and F. S. Stewart were admitted licentiates and members of the Royal College of Physicians of Ireland.

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DONALD GEORGE SUTHERLAND

M.A. CAMB., M.B., B.SC. EDIN.

Dr. D. G. Sutherland, one of the original members of the staff of the Metropolitan Water Board, came to the laboratory bench after years of practical experience in public health as medical officer of health for Sutherland. As senior bacteriological assistant to the late Sir Alexander Houston he was responsible for the routine bacteriological analysis of London's water, and he played an important part in the development of the *Bact. coli* test for water and in the differentiation of members of the coliform group of organisms. He also published a dissertation on spore-bearing anaerobic organisms as criteria in the bacteriological examination of water-supplies.

Born at Brora, he was educated at Watson's College, Edinburgh, and at Edinburgh University where he was awarded the university medal for public health and forensic medicine in 1885. The following year he graduated M.B., and three years later took his B.SC. in public health. After experience of general practice at Stirling and Dornoch he was appointed M.O.H. for Sutherlandshire in 1890 and he held this post till in 1900 he came south to work as an advanced research student at St. John's College, Cambridge, where he took his M.A. degree. During the smallpox epidemic of 1901–02 he was engaged in the preparation of calf lymph for the Local Government Board, whom he continued to serve till in 1905 he was appointed to the Metropolitan Water Board. Here he remained till he retired 26 years later.

A man of many gifts and many interests, besides his medical and scientific qualifications he was a barrister-at-law of the Middle Temple and an able mathematician, and his publications ranged from an essay on Scottish surnames to a discussion on alcohol as a help or a hindrance to efficiency. "Full of charm and kindliness, Sutherland was always ready to advise his colleagues," writes D. B. B., "and he took a keen interest in the welfare of the junior members of the staff. A Quaker born and bred in the Scottish Highlands he had the characteristics of his race and upbringing, and an unswerving love of truth and justice dominated his character." When he reached the age of retirement he was persuaded to remain another year with the board, but in 1931 he retired to Brora where he continued to take a discerning interest in public health. He died at Ealing on Jan. 10 at the age of 82. His son Dr. H. H. D. Sutherland is in practice in North Kensington.

WILLIAM FULTON NEIL

B.SC., M.B. OTAGO F.R.C.S.

Mr. W. F. Neil, of Nottingham, who died on Jan. 21, was a New Zealander. Qualifying at Otago in 1906, he spent a short time in practice before coming to England, where his first appointment was that of house-surgeon at Nottingham General Hospital. In 1909 he took his F.R.C.S., and in 1914 he joined the R.A.M.C., serving in France as surgical specialist. Owing to shortage of staff, however, he was recalled to the Nottingham General Hospital for the last two years of the war, and soon afterwards he was appointed honorary surgeon. In consulting practice he quickly established a reputation in the district as a sound surgeon, and this reputation he maintained and extended until his death. He became an active member, and president, of the local medical society, and he was also one of the senior members of the Travelling Surgical Club, whose presidency he held for several years. In this capacity he formed friendships with many Continental surgeons, and particularly with Professor Finsterer, whom he often visited in Vienna.

A colleague writes: "Apart from his happy home life, Neil's chief interest was his work for the hospital, from which he was never deflected by his success in private practice. He developed a high standard of abdominal surgery in Nottingham, and he took a keen interest in training his house-surgeons, many of whom now hold positions of importance. He also played a leading part in planning new buildings and in improving the hospital administration. From the first, it was apparent that he was a man of outstanding personality and great personal charm: his energy and devotion to surgery were unfailing, and he was always popular with his colleagues, whose confidence and affection he won by his work as chairman of the medical staff committee. In his daily work he was calm and forbearing, and he was equally kind and considerate to patients and staff, to whom his death came as a sad blow. He was a great and loyal friend."

Of Mr. Neil's three children, a son and a daughter are members of the medical profession.

Births, Marriages, and Deaths

BIRTHS

ALWYN-SMITH.—On Jan. 30, in London, Dr. Alison Alwyn-Smith (née Laing), the wife of Dr. Peter Alwyn-Smith—a daughter.

INGHAM.—On Jan. 25, the wife of Dr. R. J. Ingham, of Tenby—a son.

JENNER.—On Jan. 28, at Sherborne, the wife of Dr. Martin Jenner—a daughter.

LYTLE.—On Jan. 29, at Woking, the wife of Major J. D. M. Lytle, R.A.M.C.—a son.

NEUSTATTER.—On Jan. 27, at Beaconsfield, the wife of Major W. L. Neustatter, R.A.M.C.—a son.

SOLOMON.—On Jan. 31, at Beaconsfield, the wife of Dr. R. M. Solomon—a daughter.

WRIGHT.—On Jan. 25, in the London Hospital, the wife of Lieutenant J. T. Wright, R.A.M.C.—a son.

MARRIAGES

BEVAN—JUDSON.—On Jan. 29, at Poona, Bryan Bevan, captain R.A.M.C., to Elaine Judson, lieutenant I.M.S.

BLANSHARD—ROSENWALD.—On Dec. 28, at Patras, Paul Blanshard, major R.A.M.C., to Caroline A. Rosenwald, captain U.S.P.H.S.

ELLIOTT—GEMMELL.—On Feb. 2, at Huntingdon, Howard Derbyshire Elliott, M.B., to Mary Gemmell, squadron-officer W.A.A.F.

HAYES—OWEN.—On Jan. 31, at Hendon, Clifford Hayes, major R.A.M.C., to Gwendoline Owen, M.B.E., Q.A.I.M.N.S./R.

NELSON—WALKER.—On Dec. 1, John W. Nelson, M.R.C.S., Colonial Medical Service, to Anne K. Walker, B.SC., of Luanshya, Northern Rhodesia.

STRATON—SCOTT.—On Jan. 29, at Stokes Poges, Thomas Straton, M.B., to Rae Hervey Scott, M.B.

DEATHS

DOUGLAS.—On Jan. 31, Harold Archibald Douglas, M.D. Camb., of Chatham.

GREEN.—On Jan. 26, at St. Leonards-on-Sea, Albert Green, M.B. Lond., aged 85.

HUGHES.—On Jan. 24, at Chichester, Sidney Hughes, M.R.C.S.

LESSING.—On Jan. 28, at Fort William, Florence May Lessing, M.R.C.S.

MITCHELL.—On Jan. 28, at Newquay, Cornwall, David Robertson Mitchell, M.B. Glasg.

RICHARDS.—On Jan. 25, Walter Guyon Richards, M.R.C.S., of Fordington Road, Highgate.

SAINT.—On Jan. 30, at Herne Bay, Frances Emma Turle Saint (née Evans), L.R.C.P.E., aged 77.

STANTON.—On Feb. 1, Elizabeth Stanton (née O'Flynn), M.R.C.P., widow of Sir Thomas Stanton, K.C.M.G., F.R.C.P.

WALTERS.—On Feb. 2, at Farnham, Surrey, Frederick Rufenacht Walters, M.D., M.R.C.P., F.R.C.S., aged 88.

Appointments

BECK, ARTHUR, M.D., D.A.: M.O., Tanganyika.

BHAGAN, K. A., M.R.C.S.: M.O. (Grade C), Trinidad.

GORDON, DOUGLAS, M.B. Edin., D.M.R., D.M.R.D.: temp. hon. asst. physician, X-ray dept., Croydon General Hospital.

*HALBERSTAEDTER, MAX, M.B. Lond., F.F.R., D.M.R.E.: radio-therapist, St. Mary's Hospital, London.

*HARRISON, M. E. S., M.D. Edin., M.R.C.P.E., F.R.C.S.E.: hon. surgeon, ear, nose, and throat dept., Scunthorpe and District War Memorial Hospital, Lincs.

LEES, ROBERT, M.D. Edin., F.R.C.P.E.: M.O. in charge of V.D. dept., Leeds General Infirmary.

PATERSON, J. A. R., M.B. Aberd.: M.O., Northern Rhodesia.

SCOTT-FORBES, HUGH, M.R.C.S., D.P.M.: additional temp. county psychiatrist for Devon.

* For one year.

Dr. G. H. TOVEY has been appointed director and Dr. F. W. POTE deputy director of the Ministry of Health regional blood transfusion depôt, Southmead Hospital, Bristol (Tel.: Bristol 68021), which has taken over the civilian transfusion responsibilities in region VII, previously borne by the Army blood-supply depôt.

Dr. G. H. PERCIVAL has been appointed the first holder of the Grant chair in dermatology at the University of Edinburgh.

Dr. Percival, who is 44 years of age, qualified M.B. Edinburgh in 1923; he obtained the D.P.H. in 1925, M.R.C.P.E. in 1926, PH.D. in 1927, and M.D. and F.R.C.P.E. in 1931. He was a house-physician at the Royal Infirmary, Edinburgh, and held a Vans Dunlop and a Grocers' Company research scholarship. After studying in Paris, Lausanne, and Zürich, he returned to Edinburgh where he was appointed assistant physician, and later physician, to the skin department of the Royal Infirmary. Dr. Percival is the joint author of *An Introduction to Dermatology*, now in its tenth edition, and of various contributions on skin diseases and other disorders. He is dermatologist to the South-East Scotland E.M.S. area.

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Notes and News

RIGHTS OF ANIMALS

FONDNESS for animals usually gives rise to quarrels—an axiom tellingly illustrated by Fougasse in the prospectus just published by the Universities Federation for Animal Welfare.[1] The federation, however, take pride in keeping clear of quarrels; their function is to serve animals. Since their origin in 1926 as the University of London Animal Welfare Society they can claim to have got through a good deal of work, and to have grown greatly in membership. Component societies were formed before the recent war in the universities of London, Oxford, Cambridge, and the South-West of England, Exeter, with a sister society in Kyoto; but membership is also open to anyone who likes to join either as an ordinary member (if he is a graduate or undergraduate or a member of the teaching or administrative staff of any British university, or if he holds a professional qualification approved by the governors), or as an associate member (if he is a person without a university qualification but in sympathy with the aims of UFAW).

... quarrels to which a fondness for animals usually gives rise...

Among other things the federation have worked to improve the lot of laboratory animals, and are publishing a handbook on their care. The number of experiments performed on animals in this country has steadily increased from 311 in 1883 to about 1,000,000 a year, and is expected to increase much further. No antivivisection bill has reached a second reading in either House since 1883, and the federation maintains that the humane treatment of animals used for experiment depends mainly on the experimenters rather than on legal regulations.

The federation promoted the Gin Traps (Prohibition) Bill, which was defeated in the Lords in 1935; they initiated the appointment of the Mersey Committee on damage by rabbits, and promoted the Damage by Rabbits Act, 1939, clause 5 of which prohibited the trapping of rabbits in the open; and they have plans for further legislation in hand. Short lectures have been given to children, accompanied by pin-up pictures of the animals described. A journal started before the war is to be revived as soon as possible, and in due course the *Animal Yearbooks* will be issued again. In order to prove that rabbits can be destroyed by humane methods the federation helped Messrs. Geo. Monro Ltd. and Mr. R. M. Lockley to clear Skokholm Island—one of the most difficult of infested areas. The results have been described in *Rabbits on an Island*. Members of UFAW include vivisectors and antivivisectionists, opponents of blood-sports and masters of foxhounds, and both vegetarian and carnivorous types of men. It is found that "ill-feeling is disarmed when the truth is ascertained impartially and told without spite."

Subscriptions from ordinary members form only a small part of the federation's income, most of which comes from larger contributions and legacies. They now have an effective development fund and hope to use it as animals would wish.

TRAFFIC IN OPIUM AND OTHER DANGEROUS DRUGS

THE advisory committee of the League of Nations has analysed the annual reports by governments on the traffic in opium and other dangerous drugs for 1940. The war years have dislocated and delayed the preparation and presentation of the usual annual reports from the countries which are parties to the several opium conventions. It has therefore been impossible to gather the basic material for the usual synoptic tables giving a statistical review of the world production and consumption of narcotic drugs. Moreover the variations in the exchange rates in the different countries have made comparisons based on financial statistics valueless or misleading. Thus in 1940 only 8 of the countries and territories in Europe furnished annual reports, as against 26 in 1936.

Numerous legal and administrative changes have been made in various countries in regard to dangerous drugs. In the United States, by a recent Act of Congress, aliens convicted under antinarcotic laws can be deported. China is inaugurating a policy of "absolute suppression" to supersede "gradual suppression," while Generalissimo Chiang Kai-Shek remarks: "To fight against Japan is to struggle for the existence of the nation; to fight against opium is to rehabilitate the health of the people." In the United Kingdom the number of known addicts is 505 (251 men and 254 women), of whom 80 are doctors, 3 dentists, 5 pharmacists, and 2 veterinary surgeons. In Turkey heroin is the drug favoured by addicts. In Colombia it is urged that barbituric drugs should be dealt with in the same way as derivatives of opium. In the Shanghai settlement addiction to opium is widespread and no improvement is discernible. In Aden opium and other narcotics are freely sold to addicts and opium-smoking is not prohibited. In the Lebanon a vigorous police campaign has been conducted against the cultivation of Indian hemp, and the amount destroyed in 1940 was equivalent to 800,000 kg. of prepared hashish. The amount of opium produced in British India in the year was 38,207 kg., with 11% morphine content. As regards coca leaf in Colombia the consumption in 1940 was 131,222 kg., whereas 40,000 kg. was the amount furnished to the Permanent Central Opium Board; marihuana cigarettes made from Indian hemp have received the active attention of the health authorities.

It is hoped that, with the end of the war in Europe and the Far East, international commerce in drugs of addiction may return to normal and the advisory committee may be able to resume its review of world production, manufacture, consumption, and distribution.

PHARMACOLOGY AND CHEMOTHERAPY

THE first number of the *British Journal of Pharmacology and Chemotherapy* will shortly appear, published for the British Pharmacological Society by the British Medical Association. Pharmacology and chemotherapy are two aspects of a subject which is rapidly expanding with promise of further great development. Not only pharmacologists but also clinicians, chemists, biochemists, physicists, bacteriologists, pathologists, and other biologists, working in both university and industrial laboratories, have contributed to its advances, but their work is scattered throughout numerous journals. In the opinion of the British Pharmacological Society there is need for a new British journal which will bring together work, in all these fields, which is concerned with the effects of chemical substances on animals, living tissues and their chemical systems.

The journal, which will publish original observations in all branches of pharmacology and experimental chemotherapy, including the biochemical and pathological aspects, will be edited by a board consisting of Prof. J. H. Gaddum, M.R.C.S., F.R.S., Prof. J. H. Burn, M.D., F.R.S., Dr. F. Hawking, Mr. H. R. Ing, D.PHIL., Dr. Nathan Mutch, Mr. C. M. Scott (Imperial Chemical Industries, Ltd.), Prof. F. R. Winton, M.D., and the editor of the *British Medical Journal*. Papers intended for publication should be sent to Dr. Ing at the Department of Pharmacology, Oxford. Each volume will consist of four quarterly parts and will cost 25s. Subscriptions should go to the British Medical Association, B.M.A. House, Tavistock Square, London, W.C.1.

FORMULA OF PALUDRINE

THE formula of 'Paludrine' (I.C.I.), the new synthetic anti-malarial agent, has now been announced; it is N_1-*p*-chlorophenyl-N_5-isopropylbiguanide, and is used in the form of a salt such as the hydrochloride. The drug, whose discovery was announced last November (see leading article, *Lancet*, Nov. 17, 1945, p. 639), promises to prove at least as effective as mepacrine in the treatment of malignant tertian and benign tertian malaria; and so far no toxic effects have been reported. Imperial Chemical Industries, in whose laboratories paludrine was discovered, has started limited production, and is preparing for full-scale manufacture; it is expected that it will cost less than mepacrine. Mr. F. H. S. Curd and Mr. F. L. Rose, who synthesised the drug, gave an account of its development to the Chemical Society in London on Feb. 7. Mr. D. G. Davey, who made biological tests of its potency, is completing a tour of Australia and India where he has been collecting the results of field trials.

1. Obtainable from the Secretary, UFAW, 284, Regents Park Road, London, N.3.

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University of Oxford

In a congregation held on Jan. 24, the following degrees were conferred :—

D.M.—David Whitteridge.

B.M., B.Ch.—G. A. S. Lloyd, J. S. P. Rawlins, C. G. White, I. C. Todd, A. J. Ogg, *R. P. C. Handfield-Jones.

* In absence.

University of Cambridge

Chair of radiotherapeutics.—The university is to establish a chair of radiotherapeutics, which will be a whole-time appointment, at a stipend of £1350 a year. The first holder will be Dr. J. S. Mitchell.

Dr. Mitchell qualified at Cambridge in 1934. He became PH.D. in 1937, and obtained the D.M.R. in 1943. He is a fellow of St. John's College, and holds a Beit memorial fellowship for research at the colloid science laboratory. He was resident medical officer in the radiotherapy department of Christie Hospital, Manchester, before taking charge of the radiotherapy department at Addenbrooke's Hospital. In 1944 Dr. Mitchell went to Canada on Government service, but has now returned to this country. He is the author of several papers on cellular metabolism.

Research into causes of ageing.—The Nuffield Foundation has offered the university £2000 for initial outlay, and £6000 a year for three years, for an investigation into the causes and results of ageing. It will be made under the direction of Prof. F. C. Bartlett, F.R.S., at the psychological laboratory.

Royal College of Physicians of London

At a comitia held on Jan. 31 with Lord Moran, the president, in the chair, Dr. B. T. Parsons-Smith was re-elected the representative of the college on the Queen's Institute of District Nursing, and Prof. J. W. McNee and Sir Arthur MacNalty on the Imperial Cancer Research Fund. Reports were approved from the committee appointed to consider the training of general physicians (see p. 208), from the social and preventive medicine committee (on student health), and from the committee on dermatology (see p. 205).

The following having satisfied the censors' board were elected to the Membership :

H. W. Bunjé, M.B. Lond.; Glenys M. M. Donaldson, M.B. Edin. H. H. Doss, M.B. Cairo; Alexander Erdei, M.D. Vienna; R. H. J. Fanthorpe, M.B. Lond.; H. McC. Giles, M.B. Camb.; C. H. Goldmann, M.D. Leipzig; Susanna Gordon, M.D. Chicago, M.B. Lond.; H. N. W. Harley, M.B. Lond.; W. E. Henley, M.B.E., D.M. Oxfd; Mark Hewitt, M.B. Lond.; A. L. Humphrey, L.R.C.P.; D. G. James, M.B. Camb.; S. T. H. Jenkins, M.B. Lond.; J. D. Judah, B.M. Oxfd; J. J. Kempton, M.B. Brist.; Madeleine J. Mackenzie, M.B. Lond.; T. N. Morgan, M.D. Aberd.; Leslie Nancekievill, M.B. Lond.; L. R. Patel, M.D. Bombay; M. G. Philpott, M.B. Lond.; J. D. Roger, M.D. Toronto; Robert Schneider, M.D. Berlin; J. C. Scott-Baker, M.B. Lond.; J. C. Sloper, M.B. Camb.; P. M. Smythe, M.B. Camb.; C. J. Williams, M.B. Lpool; Hermann Wolfsohn, M.D. Lond.; and F. J. Zacharias, M.B. Lpool.

Licences to practise were conferred upon the following 159 candidates (132 men and 27 women) who have passed the final examination of the conjoint board and have complied with the by-laws of the college :

D. C. Adamson, R. W. Adlard, P. K. A. Andrews, E. H. Annels, D. A. Arthur, K. M. Backhouse, C. E. Bagg, R. I. W. Ballantine, D. A. N. Barran, A. J. Barry, J. B. Berry, A. V. G. Bibby, G. E. Bond, J. G. Briant, H. G. Broder, William Brown, M. K. Bryce, Kenneth Burchill, D. J. Burnett, G. H. Carrick, N. R. Chan-Pong, Richard Clitherow, H. W. Colson, Olive Cooke, M. G. Cox, W. W. Cree, P. W. Dagger, D. G. Dalgliesh, P. W. Darby, W. H. Davies, H. R. De Vitre, Edward Dillistone, Jean M. Druce, Lucy M. Dunkerley, J. F. Durrans, Mary E. Eagles, Seymour Edelman, Sidney Eden, M. M. El Shinnawi, D. G. Evans, G. M. H. Evans, L. A. J. Evans, Elizabeth P. E. Everard, Elizabeth F. Everitt, Mary E. G. Feetham, P. A. Feldman, M. R. Fell, A. E. Flatt, J. M. Forbes, T. R. W. Forrest, Frances A. Fouracres, J. M. Garratt, E. B. Gethen Smith, Jean M. Gilbert, M. J. Gilkes, John Gloster, J. H. H. Glyn, Beryl M. Goetzee, Stanley Goldwater, Janet Gordon, R. L. Greenwood, A. W. Halfhide, W. M. C. Hallinan, R. J. C. Hart, P. M. R. Hemphill, N. D. H. Heneghan, A. C. Hill, Gina L. Hobbs, Hans Hofstadter, B. H. Hogben, Vera Holdway, H. B. Houldsworth, J. D. Huntley, F. L. Jackson, Pauline M. Jackson, G. J. Jacobs, G. V. Jaffé, D. W. James, H. C. W. James, A. M. Johnson, A. T. Johnson, I. H. D. Johnston, G. F. Jolly, I. C. Jones, J. W. Jordan, W. P. Kelly, P. D. A. Kent, D. L. Kerr, S. J. Krister, Margaret A. Lakeman, C. H. B. Lawfield, Elizabeth J. Lee, Kenneth Lowe, D. M. O. Lowry, H. A. R. Loxdale, Grace M. Lukose, Phyllis E. Lyne, N. J. C. McGill, H. W. Macintyre, E. W. F. Mack, Freda S. Mackover, I. K. R. McMillan, Sheila M. McNelle, A. E. Malone, F. M. Mann, Bruce Marsden, Martha H. Martin, R. F. Martin, C. G. W. Mason, J. D. Medhurst, D. McV. Merritt, R. H. B. Mills, W. I. Murdoch, Donald Nuttall, R. H. Oldfield, T. C. L. Parry, R. A. J. Pearce, J. O. Pearce Edgcumbe, R. M. Penny, P. P. Philip, Carol M. Plackett, R. M. Powell, R. D. Price, W. L. G. Quinlivan, O. T. Randell, S. S. Raphael, R. W. Rapinet, A. T. Richardson, J. H. Ridgwick, Yvonne H. H. Roberts, Calmen Rosen, C. T. Ross, Dorothy J. Roth, A. H. Saddler, Roger St. Aubyn, D. V. Salkeld, Frances M. Saunders, R. E. Sidebotham, N. H. Silverton, R. S. Smylie, K. A. Sowden, M. H. Stroud, W. K. Sutton, A. K. Thomas, R. H. Thomlinson, J. R. Tighe, H. W. Topham, D. A. H. Trythall, Harold Wainstead, E. J. M. Weaver, Joan W. Wilkinson, J. D. Wilkinson, R. H. Wilkinson, J. R. B. Williams, R. D. Williams, C. J. Wilson, R. E. Woolley, G. R. Wotton, and Sybil R. Yeates.

Diplomas in laryngology and otology, psychological medicine, medical radio-diagnosis and anæsthetics were conferred on those named at recent meetings of the Royal College of Surgeons of England (*Lancet*, 1945, ii, 656 and 867, 1946, i, 111).

Diplomas in public health were also conferred jointly with the Royal College of Surgeons on the following :

John Attard, Ada Barnett, J. E. Dickson, Jack Fielding, T. H. Harrison, C. F. L. Hill, P. G. C. Jones, and M. S. Moitra.

Scottish Conjoint Board

At recent examinations of the board of the Royal Colleges of Physicians and Surgeons of Edinburgh, and the Royal Faculty of Physicians and Surgeons of Glasgow, the following were successful :

J. B. Bale, Gordon Brill, J. E. Burdett, E. B. Cowan, R. M. Dykes, A. F. M. El-Nomani, G. W. Farrington, J. L. Fine, Janet H. A. Fleming, Allan Foreman, Hanna M. M. Girgis, William Henderson, Mary P. Hughes, F. J. G. Kinsella, A. K. Kuta-Dankwa, Murdina Macrae, Ewen MacSween, Almena M. Maragh, T. A. Morton, R. A. K. Ross, E. De S. Sar, and J. S. P. Wilson.

Lothar Seewald, M.D. Bonn, was also admitted to the licentiateship as a graduate of a recognised foreign university.

Medical Diary

FEB. 10 TO 16

Monday, 11th

MEDICAL SOCIETY OF LONDON, 11, Chandos Street, W.1

8.30 P.M. Mr. A. C. Palmer: Ætiology, Treatment, and Prognosis of Procidentia.

Tuesday, 12th

UNIVERSITY OF LONDON

5.15 P.M. (University College, Gower Street, W.C.1.) Dr. F. Bergel, PH.D.: Etiotropic Compounds: Antimicrobials. (Last of five lectures.)

ROYAL COLLEGE OF PHYSICIANS, Pall Mall East, S.W.1

5 P.M. Dr. H. E. Magee: Application of Nutrition to Public Health—Some Lessons of the War. (First of two Milroy lectures.)

ROYAL SOCIETY OF MEDICINE, 1, Wimpole Street, W.1

5.30 P.M. *Experimental Medicine and Therapeutics.* Lieut.-Col. J. M. Marshall, Dr. F. R. Selbie, Mr. A. J. King: Penicillin in the Treatment of Syphilis.

5.30 P.M. *Psychiatry.* Lieut.-Col. A. T. M. Wilson, Dr. Maxwell Jones: Psychiatric Problems of Repatriated Prisoners-of-War.

ROYAL INSTITUTION, 21, Albemarle Street, W.1

5.15 P.M. Prof. H. Hartridge, F.R.S.: Recent Advances in the Physiology of Vision. (Third of four lectures.)

MEDICAL SOCIETY OF LONDON

5.30 P.M. Mr. A. C. Palmer: Disorders of Menstruation. (Lectures for demobilised medical officers.)

Wednesday, 13th

ROYAL SOCIETY OF MEDICINE

4.30 P.M. *Physical Medicine.* Dr. W. S. C. Copeman, Dr. D. C. Norris: Prevention and Early Treatment of Rheumatism with special reference to the Prevention of Industrial Absenteeism.

Thursday, 14th

ROYAL COLLEGE OF PHYSICIANS

5 P.M. Dr. H. E. Magee: Application of Nutrition to Public Health—Some Lessons of the War. (Second of two Milroy lectures.)

ROYAL SOCIETY OF MEDICINE

5 P.M. *Ophthalmology.* Mr. O. M. Duthie, Mr. John Foster: Indications for and Technique of Intracapsular Extraction of Cataract. (Cases at 4.30 P.M.)

PHARMACEUTICAL SOCIETY, 17, Bloomsbury Square, W.C.1

7 P.M. Prof. G. A. H. Buttle: War Experiences in Therapeutics.

EUGENICS SOCIETY

5 P.M. (26, Portland Place, W.1.) Prof. Godfrey Thomson: Trend of National Intelligence. (Galton lecture.)

EDINBURGH POSTGRADUATE LECTURES

4.30 P.M. (Royal Infirmary.) Dr. J. P. Stewart: Experiences of an Otologist on Active Service. (Honyman Gillespie lecture.)

Friday, 15th

ROYAL SOCIETY OF MEDICINE

8 P.M. *Obstetrics and Gynæcology.* Prof. W. H. Newton, Mr. G. W. Theobald, Mr. W. C. W. Nixon: Water Metabolism in Pregnancy.

8 P.M. *Radiology* and *Neurology.* Dr. R. McWhirter, Mr. J. Pennybacker, Dr. Dorothy Russell: Radiation Treatment of Cerebral Tumours.

FACULTY OF RADIOLOGISTS

2.30 P.M. (Royal College of Surgeons, Lincoln's Inn Fields, W.C.2.) Dr. E. Rohan Williams, Mr. L. G. Phillips, Mr. Aleck Bourne: Value of Antenatal Radiological Pelvimetry.

MEDICAL SOCIETY OF LONDON

5.30 P.M. Mr. A. Tudor Edwards: Indications for Chest Surgery. (Lectures for demobilised medical officers.)

WEST LONDON MEDICO-CHIRURGICAL SOCIETY

8.30 P.M. (West London Hospital.) Clinico-pathological and general meeting.

Saturday, 16th

BIOCHEMICAL SOCIETY

11 A.M. (London School of Hygiene, Keppel Street, W.C.1.) Discussion on Amino Sugars and Uronic Acids in Nature.

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ANCIENT APOTHECARIES AND MODERN BIOCHEMISTS*

E. C. DODDS
M.V.O., M.D. Lond., F.R.C.P., F.R.S.
COURTAULD PROFESSOR OF BIOCHEMISTRY IN THE UNIVERSITY OF LONDON; DIRECTOR OF THE COURTAULD INSTITUTE OF BIOCHEMISTRY, MIDDLESEX HOSPITAL, LONDON

MY purpose today is to give a picture of the development of the Society of Apothecaries during the last 300-odd years and to demonstrate the great contributions which this ancient body has made not only to medical practice but also to science in general. The history of the society has been reviewed elsewhere (Barrett 1905, Wall 1932), but I must begin by briefly recalling how it came to possess a charter of its own and to be constituted in the form of a city company.

To understand exactly what an apothecary was, one must know something of the practice of medicine in the early part of the 17th century. The dominating figure of this period was the physician, who was a fellow of the Royal College of Physicians, founded by Henry VIII in 1518 at the request of his own physician, Thomas Linacre. The fellowship of this college was a closely limited and dignified affair, and it was impossible for anyone to be a fellow unless he were a graduate of either Oxford or Cambridge—a state of affairs which continued until 1835. The physician of those days had nothing to do with drugs on the one hand or with any form of surgery or manipulative treatment on the other. To look after these other branches there were two groups of practitioners: bleeding, cupping, and the like, were performed by barbers and barber-surgeons, while the compounding and administration of drugs was under the care of the apothecary. The apothecary was not supposed to give any advice whatsoever on the treatment, but was merely to carry out the instructions of the physician. He was therefore in a similar position to that of the modern pharmaceutical chemist, and we shall see later that there were other striking similarities between these two bodies of people, separated as they are by very nearly 300 years.

Since the main function of the apothecaries was to supply drugs, they were of necessity business men primarily. In the 17th century all business in the city of London was still in the hands of guilds and companies. Not being regarded as important enough to have a guild of their own, the apothecaries were attached to the Grocers' Company. Up to the 17th century the grocers did an extensive trade in the importation of drugs from abroad and the actual manufacture or compounding of drugs into remedies. Many of these they sold direct to the public.

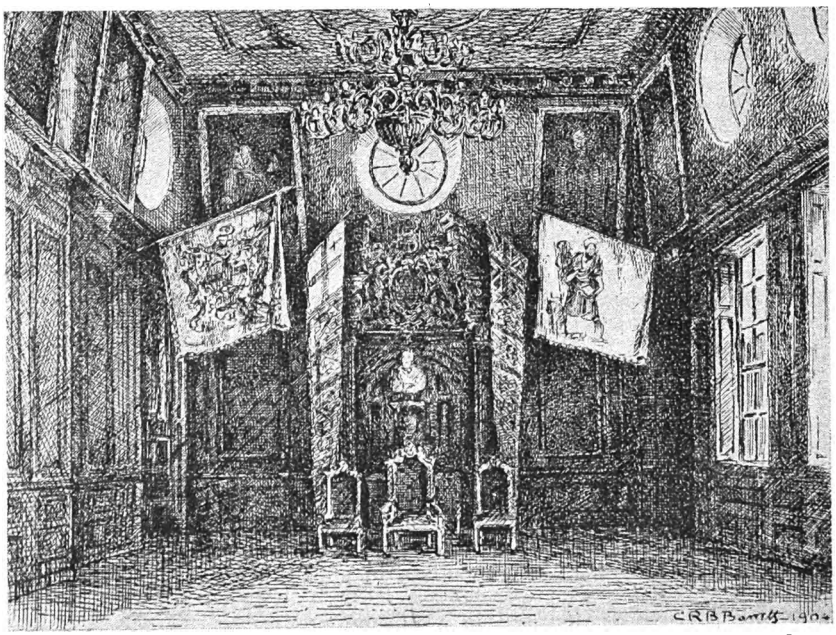
The real story of our society begins in 1617 when, through the combined efforts of Theodore Turquet de Mayerne, physician to the King, and Gideon de Laune, apothecary to the Queen, the Apothecaries became established as a separate company by royal charter. The Grocers raised a great outcry against this, but King James I remained firm, saying: "Grocers are but merchants. The business of the apothecary is a mystery, wherefore I think it fitting that they should be a corporation of themselves."

The hall in which we are now gathered is not the original one, but it stands on the same site. This site was part of the land between the Thames and Fleet rivers originally granted to the Black Friars. At the dissolution of the monasteries the estate was parcelled up; and, after changing hands several times, this site was purchased by the Society of Apothecaries in 1632. The new hall was built after the Great Fire of 1666 and was completed in 1676. Apart from the addition of candelabra, panelling, &c., the hall is substantially the same as it was in the latter part of the 17th century, and the apothecaries that I am going to tell you about have all sat and listened to discourses in this hall and in the evenings have partaken of those excellent meals that we associate with the name of city companies.

Instead of attempting a detailed account of the activities of the Apothecaries during the last 300 years, I propose to take three examples: the early apothecary of the 17th century, the more scientific apothecary of the middle 18th century, and the chemical apothecary of the early 19th century, who is really a bridge leading to modern chemistry and biochemistry.

THE SEVENTEENTH-CENTURY APOTHECARY

The early apothecary was in a way the poor relation of the physician, but he came into much more intimate contact with the patient than did the princely physician, and, as can be expected, he clearly saw that he could exploit this to his own advantage. The apothecaries began to give advice directly to patients, and for a time they developed unmolested as a kind of general practitioners, with the physicians as consultants. Their great opportunity came in the Plague of London. I do not wish to revive the bitter controversies between our society and the Royal College of Physicians, but one need only describe what happened in this terrible disaster. The Royal College of Physicians left London, leaving only very few representatives of their art in the city. So hurried was their departure that they left their plate behind, which was promptly looted. They appear to have had some qualms of conscience, as we read that William Johnson, a member of the society and also a kind of consulting pharmacist to the college, was left



From Barrett's History of the Society

The Great Hall—Upper End

* Lecture delivered before the Society of Apothecaries of London on March 27, 1945.

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behind with access to a stock of medicines which he was told to administer to the poor. The burden on the few physicians left in London, under the direction of Dr. Nathaniel Hodges and Dr. Thomas Witherley, was very great indeed, and there is no doubt that the members of the society played a great part in looking after the sick of London during the Plague. This really established them as practitioners of medicine rather than mere compounders of drugs.

The physicians naturally sneered at the relatively uneducated apothecaries, and it is unfortunate that the materials used for medicines in those days rather lent themselves to ridicule. For instance there was in the 17th and 18th centuries a great liking for preparations made from mummies. An extensive trade was done with the Continent in mummies, which were powdered and used for treating almost all conditions. The supply of mummies proved inadequate, and what we should describe today as a black market rapidly developed. It is said that the bodies of executed criminals were used extensively for this purpose. Another unfortunate material was derived from the skulls of criminals who had been hanged on the gallows. If one adds to these a few of the trappings of the alchemist, such as crocodile and owl, we get a picture of what the apothecary must have looked like in his working surroundings. Here is an apothecary's advertisement of the period which shows what a terrible mixture of remedies, some quite useful and others utterly worthless, existed at the time:

"Ambrose Godfrey Hanckwitz, chemist in London, Southampton Street, Covent Garden, continues faithfully to prepare all sort of remedies, chemical and galenical. He hopes that his friends will continue their favours. Good cordials can be procured at his establishment, as well as Royal English drops and other articles, such as Powders of Kent, Zell and Contraferva, Cordial red powder, Gaskoins Powder, with and without benzoar, English smelling salts, true Glauber's salts, Epsom salt and volatile salt of ammonia stronger than the former. Human skull and hartshorn, essence of ambergris, volatile essence of lavender, musk and citron, essence of viper, essence for the hair, vulnerary balsam, commendeur balsam for apoplexy, red spirit of purgative cochlearia, spirit of white cochlearia, and others. Honey water, lavender water of 2 kinds, Queen of Hungary water, orange flower water, arquebusade."

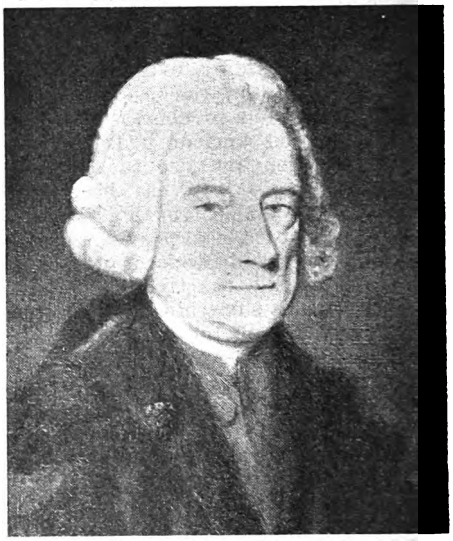
As I have already said, the physicians attacked the apothecaries with great bitterness and attempted to ridicule them. A typical example of these attacks is the following quotation from *The Dispensary* by Sir Samuel Garth, written in 1699:

"Long has he been of that amphibious fry,
Bold to prescribe and busie to apply,
His shop the gazing vulgar's eyes employs
With foreign trinkets and domestick toys.
Here mummies lay most reverently stale,
And there the tortoise hung her coat of mail,
Not far from some large shark's devouring head
The flying fish their finny pinions spread.
Aloft in rows large poppy heads were strung,
And near a scaly alligator hung.
In this place drugs in musty heaps decayed,
In that dried bladders and drawn teeth were laid."

The position of the apothecaries was finally legalised in 1703, when the society won a judgment in the House of Lords which established for all time their right to prescribe and treat patients.

THE EIGHTEENTH-CENTURY APOTHECARY

From the welter of superstition and empiricism we turn now to the second period, the middle of the 18th century; and I will take as an example of this period one of the most distinguished members of our society, Sir William Watson, who was born in 1715 and died in 1787. He was apprenticed in 1731 and became a member of the yeomanry in 1738 and of the livery in 1750. He was a fellow of the Royal Society and for his distinguished contribution to the study of electricity was awarded the Copley medal, the greatest honour, both then and now, which the Royal Society can give. In his Experiments . . . on the Nature of Electricity Watson showed that the "stroke" of the recently discovered Leyden jar was proportioned not to its size but to the conducting surfaces of its coatings. He also noted that "the electrical force always describes a circuit" and advanced a theory that in an electrical machine the glass globes, &c., have not the electrical power in themselves but only serve as "the first movers and determiners of that power."



By courtesy of the Royal Society
Sir William Watson

In 1747 and 1748 Watson carried out some experiments together with Martin Folkes and John Bevis on the velocity of electric matter. They found that no appreciable interval could be measured between the completion of the circuit and the receipt of a shock by an observer in the middle of the circuit. In February, 1752, Watson gave an account of the experiments on electrical discharge in vacuo, on which he had been engaged since 1747. These, with those of Abbe Nollet, were the first on the subject.

Watson may be said to have been the first to employ electricity in the treatment of muscular wasting and paralysis and so is the father of medical electrical and rehabilitation treatment. In the *Philosophical Transactions* of 1763 there is a detailed description of his treatment of a case of what he called tetanus, and perhaps the following brief extracts from his paper will be of interest:

"Catherine Field . . . aged about 7 years . . . having been disordered a few days . . . was observed on Thursday, July 8th 1762 to open her mouth with great difficulty. . . . I had heretofore many times observed that in paralytic limbs, the muscles of which had for a considerable time ceased to be subservient to the will of the patient, I had been able by the means of electricity, to make any muscle I thought proper contract itself and act as a muscle, without the patient's being able to control it. I had seen in one instance the good effects of electricity in restoring to the hands and arms of a paralytic almost their accustomed strength and voluntary motion, but . . . I had never seen or known the effects of electricity in the contrary affection, viz., rigidity of muscles. . . . We ordered the patient to be electrified about the middle of November. . . . In about a fortnight the convulsions left her . . . but the rigidity continued. . . . After this such parts of her body as were thought expedient were made part of the electric circuit and were shook by the explosions of the charged vial. . . . By the end of January every muscle in her body was loose. . . . That so active a principle when properly directed to the diseased parts should have important effects, no one can doubt who has been in the least conversant with it. . . ."

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THE NINETEENTH-CENTURY APOTHECARY

I turn now to the third period of our history and take as a shining example Henry Hennell, who was apprenticed to the society in 1814. His most important contributions were made in 1826–28, and this was a period in the history of chemistry when the foundations of chemistry as we know it today were laid. Up to this time chemistry was regarded as being divided sharply into two groups, which were then called inorganic and organic, but these terms had then an entirely different meaning from what they have today. Even at the period which we are now reviewing, scientific workers were still dogged by the vitalism of the Middle Ages and regarded all the chemical products of nature, such as proteins, fats, and carbohydrates, as of so complicated a structure that the mind of man would never penetrate their constitution, much less achieve their synthesis in the laboratory. On the other hand, inorganic substances, such as elements and salts, were regarded as being within the province of the operating chemist. The early part of the last century was devoted entirely to hammering down this barrier; and, until this was completely removed, no progress could be made with chemistry as we understand it today.

According to the ordinary histories of chemistry, the whole of the credit for sweeping away this barrier goes to a German professor of chemistry at Göttingen named Friedrich Wöhler. In 1828 Wöhler succeeded in preparing urea from cyanic acid. Now cyanic acid was regarded as an inorganic substance, whereas urea was regarded as being typical of the unattainable products of nature. By this brilliant piece of work Wöhler showed that the realm of organic chemistry was just as much open to synthesis as was the simpler field of inorganic chemistry. As has happened so often in our history, particularly in the field of science, and more especially if we can find a German, we have been ready to give credit to others, without attempting to find out what contributions have been made by our own countrymen. Undoubtedly the first person to dispose of the barrier between organic and inorganic chemistry was a member of this society, Henry Hennell, who was chemical operator to the society and actually conducted the experiments that should have made him famous in the very building in which we are now assembled.

In 1825 Hennell wrote a paper On the Production and Nature of Oil of Wine. This "oil of wine" was a substance resulting from the reaction between sulphuric acid and alcohol and consisted essentially of what Hennell called "sulphovinic acid" and what we know as ethyl sulphuric acid, and a residual oil crystallisable on cooling. In the following year Hennell obtained from Faraday some sulphuric acid which had absorbed about 80 times its volume of "olefiant gas," a substance containing, among other things, ethylene. In the *Philosophical Transactions* of 1826 Hennell describes his experiments with this material:

> "It was saturated by carbonate of potash carefully evaporated to dryness and the dry mass digested in alcohol. A small quantity of a salt was obtained from the alcoholic solution, having the crystalline form and general characters of the salts I have been describing. Thus it would appear that hydrocarbon constituted of single proportionals, or 6 carbon and 1 hydrogen by weight, has the power of combining with sulphuric acid; and that whether it be evolved and then combined, as in the case of olefiant gas, or its elements separated from other compounds, as from other alcohol, it forms precisely the same combination, sulphovinic acid."

Two years later he showed that, having once obtained the ethyl sulphuric acid, it was possible to form "either ether or alcohol according to circumstances which are under perfect command."

As Hennell did not start from inorganic materials, the synthesis was not complete, but there is no doubt that the implications of his work anticipated that of Wöhler, and that he must be regarded as the first to obtain by synthesis an organic substance. So far as I know, the only public reference that has ever been made to this was in the late Professor Meldola's address to the British Association in 1895.

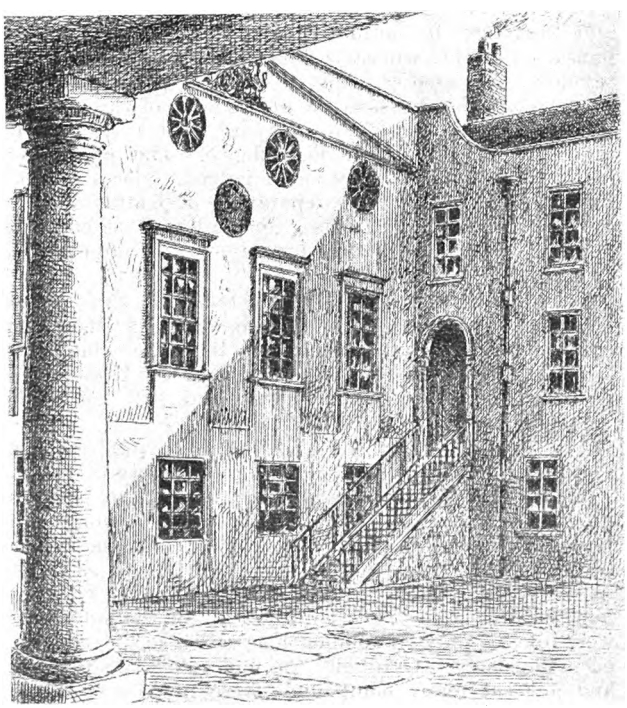
PROGRESS OF ORGANIC CHEMISTRY

The progress of organic chemistry from the middle of the last century to the present time has been one of the most dramatic events of history. The constitution of many drugs had been determined by the end of the 19th century, and a great many naturally occurring substances had been obtained synthetically.

Salicylates.—One of the most important advances was the synthetic production of salicylates. These have been used for the treatment of rheumatic conditions from the time of the old apothecaries down to the present day, but before 1874 the only source of sodium salicylate was from the hydrolysis of the methyl ester of salicylic acid, a product obtained from the plant *Galtheria procumbens* and known as oil of galtheria. In 1874 Kolbe produced salicylic acid synthetically, and from then onwards this compound was made artificially in the chemical works, which led to its cheapening and wider use.

A curious prejudice grew, however, which has not altogether died down even today. The old school of physicians refused to use the synthetic product, claiming that the natural article was very much better. Today one still sees statements in medical journals doubting whether synthetic vitamin B_1 is as good as the naturally occurring product. The establishment of synthetic sodium salicylate paved the way for a great many other therapeutic agents, and innumerable naturally occurring drugs were superseded by synthetic products.

Aspirin.—In 1899 an entirely new development in therapeutics arose. This was heralded by the discovery of aspirin, which in many ways is perhaps one of the most important landmarks in therapeutics, although the substance is so familiar today that its practical



From Barrett's History of the Society

The Front Court, Hall and Hall Stairs

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application has quite overshadowed its historical importance.

Before the introduction of aspirin the attention of workers was devoted solely to the production synthetically of bodies already occurring in nature. Now, it occurred to a group of research-workers of the Bayer company that by modifying the molecule of salicylic acid it might be possible to overcome some of the disadvantages of this drug. Thus the nauseating taste and digestive disturbances associated with salicylate therapy were well known and had been commented on almost for centuries. The German chemists therefore experimented with a group of other substances differing slightly in constitution from natural salicylic acid. Eventually they succeeded in producing aspirin, which is acetyl salicylic acid, and thus they produced an entirely artificial body which possesses all the advantages of the natural substance but none of the disadvantages. It is undoubtedly the most widely used therapeutic agent in the civilised world today. Its theoretical importance lies in the fact that here is a man-made article differing very considerably in constitution from anything occurring in nature, yet having the same beneficial effect. How far then is it possible to develop this new system of drugs? Time does not permit even of an enumeration of the valuable additions to the treatment of human disease that have come about through this research. One can cite 'Salvarsan' (arsphenamine), the sulphonamide drugs, and the morphine substitutes as part of that vast armoury that the physician has at his disposal today.

Synthetic Œstrogens.—As a final example of how far we can influence natural processes by entirely man-made instruments, I should like to mention the work that has been done by my colleagues and myself which led to the production of stilbœstrol.

As a result of nearly half a century's work, the constitution of the female sex hormones had been discovered by the early 1930's. It was found that they existed in nature in a series of forms, of which the most important are œstrone, œstriol, and œstradiol, the last-named being by far the most potent. This substance when administered subcutaneously, either free or in its esterified form, can take the place of the secretions of the ovary, and therefore its administration will control menopausal symptoms, will cause development of the secondary sexual characteristics, and so on. Its production was an expensive business, as the only source of the material was the urine of certain pregnant animals, pregnant mares being the commercial choice. The production in this country was very small indeed, since the most important steps in the preparation of œstradiol were covered by German patents; and unless these could be operated, it was impossible for anyone to compete with Continental producers.

Our own work began with the reflection that nature produced at least three substances differing slightly in constitution but all performing the same biological function. We therefore wondered how far it would be possible to modify the molecule and still retain the biological activity.

The first successful experiments were published by Cook et al. (1933), who described the activity of 1-keto-1 : 2 : 3 : 4-tetrahydrophenanthrene, and later certain dibenzanthracene diols. These substances, though not possessing the complicated cyclopentenophenanthrene ring system, were none the less qualitatively as active as œstradiol. From the quantitative point of view, however, there was a vast difference, for the substances were roughly only one-millionth as active as the naturally occurring body. Gradually the molecule was simplified, and a great many compounds were made and tested. Together with Sir Robert Robinson and his colleagues, we finally synthesised stilbœstrol (Dodds et al. 1938). This substance has the formula 4 : 4′-dihydro-α : β-diethylstilbene. At a later date two other compounds were produced: hexœstrol and dienœstrol, the respective formulæ being 4 : 4′-dihydroxy-γ : δ-diphenyl-*n*-hexane and 4 : 4′-dihydroxy-γ : δ-diphenyl-β : δ-hexadiene.

The appearance of these compounds had an immediate far-reaching effect in several spheres—some anticipated and some not. The three synthetic œstrogens had the following points in common: (1) they are far cheaper to produce than the natural substances, and, since the results were published in the ordinary scientific journals, no question of patent rights arises; (2) unlike the natural œstrogens, they are highly active by mouth, thus obviating the greatest objection to œstrogen therapy in the past—i.e., that they had to be administered by subcutaneous or intramuscular injection, necessitating the attendance of a doctor. Extensive clinical trials by the Therapeutic Trials Committee of the Medical Research Council very quickly showed that the substances were non-toxic and that though they caused slight nausea in some cases, they were eminently suitable for the treatment of the various gynæcological conditions that hitherto had only been amenable to natural œstrogen therapy.

Their chief application is in the treatment of the menopausal symptoms, where highly successful results have been obtained. Other uses, such as the termination of lactation, have also proved the success of these substances. From the theoretical point of view they are of great interest because they enable us to flood the body with highly active œstrogens and thereby influence the glands such as the pituitary. They also had an interesting effect in the commercial sphere, since their appearance broke the Continental cartel and patent ring on this particular form of therapeutic agent.

Perhaps the most dramatic use to which the synthetic œstrogens have been put is in the treatment of carcinoma of the prostate. The American surgeon Huggins revived interest in the castration therapy of this disease. Since the flooding of the body with an œstrogen, such as stilbœstrol, will inhibit the anterior lobe of the pituitary, it appeared that advantage might be gained from the administration of stilbœstrol to patients with carcinoma of the prostate. In 1941 Huggins reported the successful treatment of this condition, and it has since been shown that a large proportion of cases of carcinoma of the prostate are beneficially affected by the administration of stilbœstrol. Local urinary symptoms have cleared up, often within a few days, and pressure symptoms from secondary deposits have sometimes disappeared in a week. While we must proceed with the utmost caution in the interpretation of these results and must wait to see how long they will last, we can at least claim for the first time to have produced a drug which has a beneficial effect on one form of cancer when administered by mouth. The relief already given to patients is in itself sufficient justification for the amount of money and labour expended in the production of stilbœstrol; but the theoretical implications are even greater than the practical.

ENVOI

In this brief address I have tried to give a picture or a panorama of events during the last 300 years, and I have tried to keep the stream of events and figures for this period moving through the portals of this building. It is rather impressive to realise how much of this work has been done by members of the Society of Apothecaries, and that all these matters have been discussed on these premises and many of them in this hall. The profession as a whole should realise what great contributions the society has made both to science and to medical practice; and particularly should the general practitioners of this country be grateful to the body which for many years was their only friend.

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TREATMENT OF MACROCYTIC ANÆMIA WITH FOLIC ACID*

TOM D. SPIES
M.D. Harvard

IN August, 1945, the synthesis of folic acid (*L. casei* factor) was announced by sixteen investigators (Angier et al. 1945). The following month Spies, Vilter, Koch, and Caldwell reported the results of the first clinical use of synthetic folic acid in the treatment of macrocytic anæmia (Spies et al. 1945). They showed that its administration, either by mouth or parenterally, was followed by a striking hæmopoietic response in 9 cases of macrocytic anæmia, a response similar to that which follows the administration of a potent liver extract. These results were quickly confirmed in a larger series of cases reported in December, 1945, by Vilter, Spies, and Koch. At the same time Spies, López, Menéndez, Minnich, and Koch reported that the macrocytic anæmia of tropical sprue found in Cuba responds in a similar manner (Spies et al. 1946). These results marked a milestone in the progress of studies on anæmia which, with the assistance of many associates and collaborators, I have been carrying on for fifteen years.

In 1930 and 1931 I observed that many pellagrins had macrocytic hyperchromic anæmia which was cytologically indistinguishable from Addisonian pernicious anæmia. That this anæmia was not due to a lack of the intrinsic factor of Castle was clearly demonstrated by Spies and Payne (1933), who found that when the gastric juice from pellagrins was incubated with ground beef it caused a remission in persons with the Addisonian type of pernicious anæmia in relapse. In 1935 Spies and Chinn found that 63% of 30 cases of severe alcoholic pellagra had macrocytic hyperchromic anæmia. This observation convinced me that if we were ever to rehabilitate fully all the pellagrins under our care, at times we would have to consider macrocytic anæmia. Accordingly, we started our search for the chemical substance in liver which caused remission in anæmia and began to build a centre where suitable patients could be attracted and treated. This centre has developed through the aid of many philanthropic persons and foundations and particularly through large grants from the Research Corporation of New York and from the Eli Lilly Company of Indianapolis. We have observed a high incidence of both microcytic hypochromic and macrocytic hyperchromic anæmia among the patients in our clinic and have studied both types of the disease. This report, however, is concerned chiefly with the effect of folic acid in macrocytic hyperchromic anæmia. Accordingly, our studies on microcytic hypochromic anæmia may be dismissed by saying that it does not respond to folic acid.

An extensive investigation of anæmia was undertaken in which many collaborators and associates aided at various times and for varying lengths of time. These included Drs. C. V. Moore, R. W. Vilter, W. B. Bean, C. F. Vilter, C. A. Doan, L. Joe Berry, N. L. Brookens, J. K. Cline, and H. S. Collins.

A report of the observations made during the course of these studies was published by Moore, Vilter, Minnich, and Spies in 1944. They tested numerous substances, and it was found that they were not the extrinsic factor, which when incubated with gastric juice would cause a remission, nor were they the anti-anæmic factor. The substances tested included niacin (nicotinic acid), thiamine, riboflavine, calcium pantothenate, pyridoxine, inositol, *para*-aminobenzoic acid, choline, pyridoxamine, and pyridoxal. Crude folic acid concentrates likewise yielded no specific hæmatological response. In selected cases ascorbic acid was observed to cause reticulocytosis and sometimes blood regeneration. However, reticulocyte rises occurred when persons with nutritional macrocytic anæmia were fed beef muscle, an 80% alcoholic extract of beef muscle, or crude liver extract.

Intensive laboratory and clinical studies on 56 patients with macrocytic anæmia established the fact that the peripheral blood and bone-marrow findings in nutritional macrocytic anæmia are cytologically indistinguishable from those in Addisonian pernicious anæmia, and that an important point of differentiation is the presence of free hydrochloric acid in the gastric juice of persons with nutritional macrocytic anæmia and its absence in persons with Addisonian pernicious anæmia. An occasional patient with nutritional macrocytic anæmia did have an intermittent achlorhydria which might cause the disease to be confused with pernicious anæmia. From observations made during this study we also concluded that the relationship between the nutritional macrocytic anæmia and sprue is very difficult to grasp, that differentiation actually may not be justifiable, and that the final answer to the question whether the conditions represent two distinct entities or are identical may have to wait until their ætiology is more completely understood.

We have also tested, by parenteral administration, the effect of several materials of unknown structure which Dr. Joe Cline isolated while fractionating reticulogen (Cline et al. 1945). These substances have produced reticulocytosis of varying degree. In some instances rises as high as 10–12% have not been associated with positive evidence of regeneration; in others brief and minimal rises in the reticulocytes have been followed by rather remarkable regeneration of red cells, white cells, and hæmoglobin.

For a number of years Dr. L. Joe Berry, Dr. C. A. Doan, Mrs. J. Welch Myers, and I have been studying nutritional leucopenia, which is often present in malnourished persons. During a study in which we were testing a folic acid concentrate (Parke Davis) on the leucocyte equilibrium in malnourished persons we noted that clinical improvement followed the administration of this concentrate. This response seemed significant. Later Dr. T. H. Jukes and Dr. Stanton M. Hardy of Lederle Laboratories sent us some of the crystalline material which we used in 5 cases with similar results. This suggested to me that folic acid was probably an extremely important factor in red-blood-cell regeneration, but scarcity of the material made adequate testing difficult. When Dr. T. H. Jukes sent me the synthetic substance we immediately tested it in macrocytic anæmia and observed a dramatic hæmopoietic response to its oral or parenteral administration.

Macrocytic anæmias occur throughout the world, although certain types are much more common in some areas than in others. The pathogenesis of none of these anæmias is thoroughly understood, and there is much confusion concerning their diagnosis and treatment. It is hoped that folic acid therapy will aid in bringing about better understanding.

* University of Cincinnati Studies in Nutrition at Hillman Hospital, Birmingham, Alabama, and at the Calixto Garcia Hospital, Havana, Cuba, in coöperation with the Institute of Nutrition of Cuba, the Coördination Committee for Cuba, and the University of Havana.

PROFESSOR DODDS: REFERENCES

Barrett, C. R. B. (1905) History of the Society of Apothecaries of London, London.
Cook, J. W., Dodds, E. C., Hewett, C. L. (1933) *Nature, Lond.* 131, 56.
Dodds, E. C., Golberg, L., Lawson, W., Robinson, R. (1938) *Ibid*, 141, 247.
Hennell, H. (1825) *Quart. J. Sci.* 19, 96.
— (1826) *Phil. Trans.* 116, 240.
— (1828) *Ibid*, 118, 365.
Huggins, C., Hodges, C. V. (1941) *Cancer Research*, 1, 293.
Meldola, F. (1895) *Chem. News*, 72, 146.
Wall, R. C. B. (1932) History of the Society of Apothecaries and their Hall, London.
Watson, W. (1763) *Phil. Trans.* 53, 10.

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TRIAL OF FOLIC ACID IN 45 CASES

The present report, which is a tentative evaluation of the status of folic acid as a therapeutic agent in anæmia, is based on the observations made in 45 cases in Birmingham, Alabama, and in Havana, Cuba, and summarises our findings up to the present time.

In the selection of cases the following rigid criteria were adopted: (1) The patient must have a macrocytic anæmia with red-cell counts of 2·5 million or less and a colour-index of over 1. (2) He must be untreated, or he must not have been treated recently enough to interfere in any way with our evaluation of the effect of folic acid. (3) He must not have any complicating disease which might be lethal during the course of the study. (4) The bone-marrow must contain megaloblasts and have the typical erythroblastic arrest seen in macrocytic anæmia. A fifth criterion used for the selection of any patient in Cuba, where we were studying sprue, was that he must have "fatty stools" and weight loss.

The diagnosis in these cases was made only after intensive study by a number of physicians. Of the 45 patients, 41 had typical macrocytic hyperchromic anæmia diagnosed on the basis of criteria used in the past in the Nutrition Clinic in Birmingham, Alabama (Moore et al. 1944). The other 4 patients had iron-deficiency anæmia characterised by a low colour-index.

A diagnosis of pernicious anæmia was made only when there was no free hydrochloric acid, pepsinogen, or rennin in the gastric juice after histamine stimulation. A diagnosis of sprue was made only in the presence of steatorrhœa. If pregnancy was the only apparent ætiological factor present, a diagnosis of macrocytic anæmia of pregnancy was made. If the patient had a blood-picture typical of macrocytic anæmia and if there was free hydrochloric acid, pepsinogen, and rennin in the gastric juice, a diagnosis of nutritional macrocytic anæmia was made. In most instances there was complete agreement among the physicians on the clinical classification of these cases. The cases in which there was a difference of opinion were classified as indeterminate. In one case the macrocytic anæmia was associated with chronic alcoholic addiction, cirrhosis of the liver, and neuritis, and in one case it was associated with carcinoma of the stomach. Three patients with anæmia associated with leukæmia and 3 with aplastic anæmia were also selected for study. We did not expect that folic acid would be beneficial in these cases; nevertheless, we wished to make certain that it was without effect.

In 7 of the cases selected for study, pellagra, which was diagnosed only in the presence of characteristic tongue or dermal lesions, was present at the time folic acid therapy was initiated. Two of the patients with pernicious anæmia had neurological changes indicative of mild posterolateral sclerosis. One patient in the group had severe polyneuritis, and 4 had evidence of peripheral nerve involvement.

METHOD OF STUDY

All the patients except 4 were admitted to hospital for preliminary observations, base-line determinations, and therapy. These 4 patients, who lived near the Nutrition Clinic in Birmingham, were treated as ambulatory cases. They came to the clinic daily throughout the period of study.

A detailed medical and dietary history was obtained and careful physical examination was made in each case. Throughout the control period, and during the period of most active regeneration, red-cell and white-cell counts, reticulocyte counts, and hæmoglobin determinations were made daily. Thereafter these determinations were made less frequently. Bone-marrow studies were also made in each case.

Throughout the time they were in the hospital the diet of 35 of the 41 inpatients was rigidly controlled. Meat, meat products, fish, and poultry were omitted, and only a quart of milk and one egg daily were allowed. Bread, cereals, sugar, fats, vegetables, and fruits were permitted in any amount desired. A similar diet had been used in 75 cases of anæmia studied previously, and no hæmopoietic response had occurred in any of these patients while they were on this diet. We felt reasonably sure, therefore, that any hæmopoietic response would be from the folic acid administered rather than from any food the patient received. The other 6 inpatients (the 3 with leukæmia and the 3 with aplastic anæmia) were given the usual hospital diet ad libitum. The 4 patients who were treated as outpatients ate their meals at home. Because of financial limitations, these 4 persons were unable to vary their diets to any extent from day to day. According to their dietary histories the food they ate at home was similar to that eaten by the patients on the controlled diet.

At the time the study was initiated each of the patients complained of loss of strength, vigour, and appetite. In most cases there had been a considerable loss of body-weight. The diarrhœa in the patients with sprue was characterised by stools which ranged in frequency from five to twenty daily. The stools were yellow or white, watery, foamy, and foul-smelling. When diarrhœa was present in cases other than sprue the stools were watery and brownish, and their odour was not particularly foul. All the patients with diarrhœa stated that it was more severe after meals.

During the preliminary period of observations we discovered that 3 of the patients with sprue were having a hæmopoietic response, although they all denied having had anti-anæmic therapy. On questioning their physicians we found that these patients had been treated, but had not realised that they had received anti-anæmic therapy. This clearly indicates the importance of making careful and repeated base-line determinations before testing the hæmopoietic properties of any substance. Folic acid was not given to these 3 patients at this time, but they are still under observation.

To the other 42 cases synthetic folic acid was administered either parenterally or by mouth. Two patients received 20 mg. and 4 received 50 mg. intravenously every day; 2 patients received 20 mg. intramuscularly every day. To get the folic acid into solution for injection we converted it into a soluble salt by adding normal sodium bicarbonate solution. To ensure sterility the solution was then passed through a Seitz filter. To the remaining 34 patients the folic acid was given by mouth. Five patients (3 with pernicious anæmia and 2 with nutritional macrocytic anæmia) were given 10 mg. or less. The other 29 patients were given daily doses ranging from over 10 mg. up to 400 mg. When the dose was 20 mg. or more, half of it was given in the morning and the other half in the afternoon. For oral administration it was prepared by mixing it to a smooth paste with four or five drops of cold water and stirring it constantly while enough water was added to make 20 c.cm. After the patient had taken this mixture, water was added to his glass to rinse it well; and the patient also drank this in order to ensure his getting all the folic acid.

RESULTS

The following 26 cases responded to folic acid therapy: 5 patients with nutritional macrocytic anæmia, 5 with Addisonian pernicious anæmia, 8 with sprue, 3 classed as indeterminate, 3 with macrocytic anæmia of pregnancy, 1 with macrocytic anæmia associated with chronic alcoholic addiction, cirrhosis of the liver, and neuritis, and 1 with macrocytic anæmia associated with carcinoma of the stomach. In these 26 cases the initial red-cell count ranged from 1·1 to 2·97 million and averaged 1·87 million;

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on the fourteenth day it ranged from 1·58 to 3·57 million and averaged 2·69 million. The initial hæmoglobin ranged from 5·9 to 9·9 g. and averaged 7·68 g.; on the fourteenth day it ranged from 7·1 to 11·7 g. and averaged 9·73 g. The first day of reticulocyte rise occurred from the third to the seventh day; the peak occurred on the third to the eighth day. The reticulocyte count at the peak ranged from 4·6% to 31·8% and averaged 17·2%.

We could detect no improvement from either our clinical observations or our laboratory determinations in the 3 cases of aplastic anæmia, the 3 cases of leukæmia, or the 4 cases of iron-deficiency anæmia. Excluding these cases we found only one patient with macrocytic anæmia who did not respond to 10 mg. or more of folic acid. This patient was classified as a case of nutritional macrocytic anæmia in this study, although the type of anæmia has never been satisfactorily diagnosed despite the fact that she has been seen by many competent observers. She has not responded to liver extract given either by injections or by mouth during the four years she had been under observation. Her bone-marrow is hypoplastic but not aplastic. The patients who received 10 mg. of folic acid or less responded, but perhaps the response was not maximum. Study of these patients is being continued and will be reported later.

Associated with the striking hæmopoietic response was a remarkable subjective improvement in every case. Each patient voluntarily told us that he felt much stronger than he had felt for a long time and that his desire for food had returned. That this was true was apparent to all observers. These patients who before treatment had no desire to move began to walk about. They began eating all the food offered and often asked for additional servings. The typical response to synthetic folic acid therapy in the macrocytic anæmia is illustrated in the following case-report.

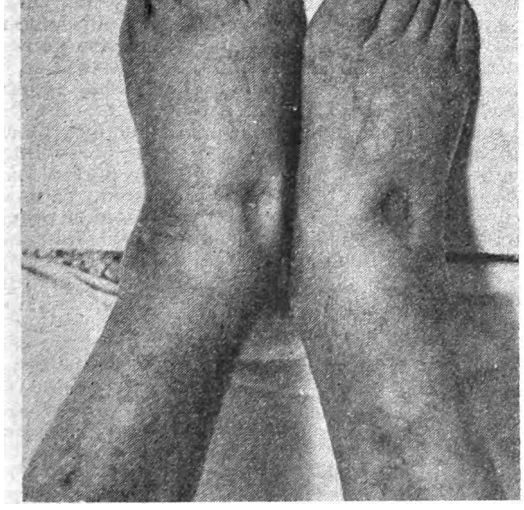

Fig. 1—Œdema of the legs, ankles, and feet; note pitting.

A Cuban woman, aged 29, referred to us by Dr. Anibal Causa of Taco-Taco, Pinar del Rio, was admitted to the Calixto Garcia Hospital, Havana, Cuba, on Nov. 13, 1945, complaining of diarrhœa, weakness, and swelling of the legs. She is the mother of 5 children ranging in age from eight years to nine days. According to the patient the 4 oldest children have "parasites" and are not well. The youngest child, whom we saw at the time the mother was admitted to the hospital, was extremely malnourished and anæmic. The patient's husband is in good health.

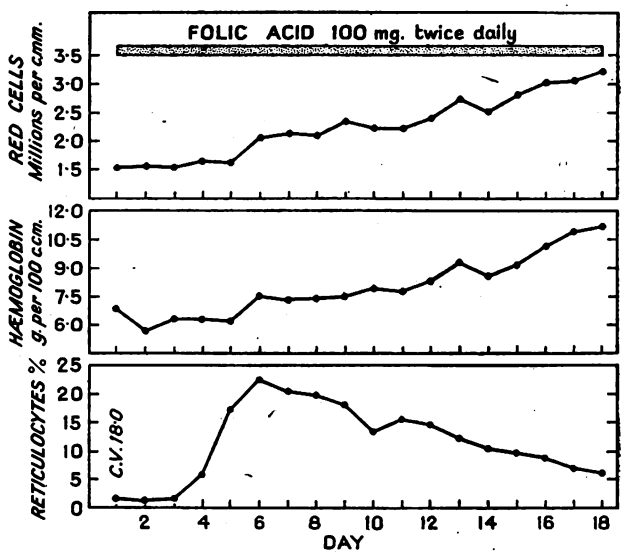

Fig. 2—Characteristic hæmopoietic response to folic acid. Note sharp rise in reticulocytes and subsequent rise in red cells and hæmoglobin.

A few weeks after the birth of the second child, seven years ago, the patient said her teeth began "dropping out." Since this time she has been unable to chew her food properly, and frequently she has had indigestion. During the first month of her last pregnancy her appetite became very poor, and soon after this her tongue became so sore that she had difficulty in eating food of any kind. Two months before the last child was born, she began having diarrhœa—four or five watery, "gassy" stools daily. Soon after this she became weak and "wished to cry all the time." The diarrhœa persisted, and the day after this child was born the patient's legs and feet became very swollen.

Dietary History.†—As long as the patient could remember, her diet had consisted chiefly of polished rice, dried beans, potatoes, viandes, cornflour, and bread. She had never liked fruits, although occasionally she ate bananas, oranges, and lemons. Three or four times a week she drank a glass of milk. Before she lost her teeth, she ate beef nearly every day; but since that time, because she has been unable to chew it well, she has seldom eaten it. She could rarely afford to buy eggs and cheese.

Physical examination showed a well-developed, extremely emaciated woman sitting or lying stoically in bed. Her pallor was striking. Her responses to the physicians who questioned her in her own language were very slow, and she was constantly on the verge of tears. She was so weak she did not wish to move or even to raise a hand. The buccal and conjunctival vessels were extremely pale. There was severe œdema of the feet and ankles (fig. 1). No abnormalities of the heart, lungs, or other systems were detected.

The *stools* were copious, bulky, gaseous, and frothy, and ranged in colour from yellow to white. At the time she was admitted, she was having 4–5 large bowel movements daily.

Laboratory Findings.—The fasting specimen of gastric juice contained free hydrochloric acid. Total blood protein was 4·2 g., the serum albumin 2·4 g., and the serum globulin 1·8 g. per 100 c.cm. The results of the red-cell, hæmoglobin, and reticulocyte determinations are shown in fig. 2.

The clinical history, physical findings, character of the stools, and laboratory determinations all supported the diagnosis of sprue.

Course.—Throughout the course of the study the patient was under the direct care of Dr. José Menéndez and myself, and she was seen almost daily by Dr. Guillermo García López and Dr. Fernando Milanes. After base-line determinations had been made, she was given 200 mg. of folic acid daily by mouth in divided doses of 100 mg. each at 10 A.M. and 3 P.M. Three days after treatment was initiated she voluntarily said that she felt stronger. She ate all the food offered, whereas before treatment she rarely took more than a bowl of soup or a cup of coffee. On the fourth day she began walking around

† The dietary history was taken by Mrs. Myrtle Neblett and Miss Jean Grant.

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the ward and assisting the nurses in the care of the other patients, and she asked for additional servings of food. For the first time since admission her fæces contained some semi-solid material, and their general consistency was mushy rather than liquid. Next day the fæces were solid and brown, and she had only two bowel movements, whereas up to then she had been having four or five large gaseous stools daily. Although her stools occasionally appeared to become almost normal and to remain almost normal for one or two days, at times they tended to become watery and foul even when her blood was regenerating. The fact that under the conditions of this study she was restricted to a diet very high in carbohydrate and almost devoid of meat or meat products may account for the stools not becoming and remaining entirely normal. The subjective improvement continued, and she started asking to be allowed to go home and to return to work. On the tenth day after treatment was started, the œdema began to subside; by the fourteenth day it had almost disappeared; and on the seventeenth day none could be detected. By this time she looked emaciated from the water loss.

Comment.—The laboratory and clinical findings leave no doubt as to the efficacy of folic acid in producing a prompt and maximum hæmopoietic response and a return of strength, vigour, and appetite. Although her stools became much more normal than they had been before treatment, they did not become completely normal nor was their improvement sustained throughout treatment. Our experience in giving liver extract to patients with sprue is that it too effects improvements in the character of the stools but that they do not become completely normal. Before any final interpretation of the effect of folic acid on the character of the fæces is made we must study more cases over a longer period.

SUMMARY AND CONCLUSIONS

These findings show that the administration of synthetic folic acid, either by mouth or parenterally, is followed by a prompt hæmopoietic response in persons with Addisonian pernicious anæmia, nutritional macrocytic anæmia, the macrocytic anæmia of pregnancy, pellagra, and the macrocytic anæmia of sprue. Associated with this hæmopoietic response is a striking increase in strength, vigour, and appetite. The subjective and objective improvement is similar to that which follows therapy with potent liver extract. Folic acid was not found to be effective in iron-deficiency anæmia, aplastic anæmia, or leuksæmia.

Determination of the minimal and average dose of folic acid will require the study of many cases. Our findings up to the present indicate that there is some variation in individual requirements. We have given as much as 400 mg. by mouth without ill effects, and we have had five patients who have responded to 10 mg. administered by mouth. Previously, one of these patients had failed to respond to 3 mg., one to 4 mg., and three to 5 mg. of folic acid administered by mouth daily for ten days. We tentatively suggest a total dosage of 20 mg. parenterally or 20 mg. by mouth.

A restricted diet was given to some patients in order to determine the anti-anæmic properties of folic acid as accurately as possible. We wish to stress that neither folic acid nor any other single chemical substance can be expected to take the place of all the nutrients essential for good nutrition. We do not recommend a restricted diet in the treatment of macrocytic anæmia—in fact, we prescribe a diet high in protein, minerals, and vitamins.

Despite the fact that there are no published reports by other workers confirming our findings,‡ our results are so striking that I have no hesitation in saying that folic acid, a vitamin present in liver, yeast, and other food materials, is a potent anti-anæmic factor in persons with certain types of macrocytic anæmia in relapse.

The expenses of this study were borne by grants from the Lederle Laboratories, Inc., and the Martha Leland Sherwin Memorial Fund. The folic acid was supplied by Lederle Laboratories, Inc.

REFERENCES

Angier, R. B., Boothe, J. H., Hutchings, B. L., Mowat, J. H., Semb, J., Stokstad, E. L. R., SubbaRow, Y., Waller, C. W., Cosulich, D. B., Farenbach, M. J., Hultquist, M. E., Kuh, E., Northey, E. H., Seeger, D. R., Sickels, J. P., Smith, J. M. jun. (1945) *Science*, **102**, 227.

Cline, J. K., Berry, L. J., Spies, T. D. (1945) *J. Amer. chem. Soc.* **67**, December.

Moore, C. V., Vilter, R., Minnich, V., Spies, T. D. (1944) *J. Lab. clin. Med.* **29**, 1226.

Spies, T. D., Payne, W. J. (1933) *J. clin. Invest.* **12**, 229.
— Chinn, A. B. (1935) *Ibid*, **14**, 941.
— Vilter, C. F., Koch, M. B., Caldwell, M. H. (1945) *Sth. med. J.* **38**, 707.
— López, G. G., Menéndez, J. A., Minnich, V., Koch, M. B. (1946) *Ibid*. **39**, 30.

Vilter, C. F., Spies, T. D., Koch, M. B. (1945) *Ibid*, **38**, 781.

‡ Dr. Carl V. Moore and his associates (Washington University School of Medicine, St. Louis, Missouri) and Dr. C. A. Doane (College of Medicine, Ohio State University, Columbus, Ohio) inform me personally that they have confirmed our observations.

PNEUMOCOCCAL MENINGITIS AFTER HEAD INJURY

TREATED WITH INTRATHECAL PENICILLIN

R. P. JEPSON, M.B., B.Sc. Manc.
CAPTAIN R.A.M.C.
GRADED NEUROSURGEON

C. W. M. WHITTY, B.M. Oxfd
MAJOR R.A.M.C.
MEDICAL SPECIALIST

From No. 5 Mobile Neurosurgical Unit

BEFORE the advent of the sulphonamides pneumococcal meningitis was a fulminating and rapidly fatal disease, its case-mortality being little short of 100%. Cable (1939) records 39 cases, all of them fatal, and emphasises the overwhelming nature of the infection: "Apart from its high mortality the disease is noteworthy for the speed with which it kills"; 26 of his patients were dead within 3 days of onset.

The position was improved by the use of sulphonamides. Hodes and colleagues (1939) treated 17 cases with sulphanilamide and its sodium salt with 8 recoveries; though, here again, of their 9 deaths 4 occurred within 24 hours of clinical onset. However, Dowling and others (1942) record a series of 67 cases receiving sulphonamides, only 4 of which recovered. It seems likely that this last figure would have been improved if those sulphonamide derivatives, such as sulphadiazine, which are known to concentrate well in the cerebrospinal fluid (C.S.F.) had been used in all cases. Nevertheless, the disease remained dangerous.

The sensitivity of pneumococci to penicillin (Fleming 1929, Chain et al. 1940) presented a new possibility of treatment, and Keefer and others (1943) reported a series of 23 cases so treated, of which 7 recovered. This does not at first sight appear to be an improvement on previous figures; but Abrahams and colleagues (1941) had shown that intravenous penicillin in the cat appeared not to pass into the C.S.F. in any quantity, so the method of giving the drug becomes important. In Keefer's fatal cases not all had had the drug intrathecally, and limited supplies had curtailed the duration of treatment. Cairns and others (1944), in a careful investigation designed especially to establish optimal dosage and route of administration, record 16 fully treated cases, with 12 recoveries, and a further 3 fatal cases in which they considered treatment incomplete. All these had intrathecal penicillin, and some of them intramuscular or intravenous also. They considered the intrathecal use of the drug safe, confirming the suggestion from the findings of Abraham and colleagues (1941) that penicillin in the cisterna magna of rabbits produced no histological disturbance. They also established that penicillin introduced into the lumbar sac diffuses satisfactorily to cerebral subarachnoid and ventricular fluids, except where an intracranial space-filling lesion is present. They concluded that early introduction by lumbar puncture only may effect a cure; but, where prompt response is not obtained, or when blockage at the basal cisterns is suspected, the ventricular route should also be used.

In this paper we record the treatment of 10 cases of pneumococcal meningitis with intrathecal penicillin

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while on active service in Italy and append some observations on the effects of penicillin preparations on normal C.S.F. The cases were all treated in forward areas.

TREATMENT

In all cases treatment included a course of sulphadiazine, previously used as a routine prophylaxis for penetrating brain wounds, with a dosage (Jepson and Whitty 1945) designed to maintain a C.S.F. concentration of 8–14 mg. per 100 c.cm. This was done because there is evidence that not all pneumococci are sensitive to penicillin; and until the bacteriological report of the first lumbar puncture was available the organism responsible for the meningitis was not known. Further, 15,000 units of penicillin was given intramuscularly 3-hourly on the assumption that an extrameningeal source of pneumococcal infection might exist. But the main attack was by direct intrathecal injection. Dosage, both individual and total, varied according to the clinical response and the bacteriology of the C.S.F. The injection was usually made every 24 hours, since previous observations had shown us that 5000–10,000 units of penicillin in the C.S.F. inhibited a standard organism up to 24 hours. When the clinical state was very grave, lumbar puncture was done more frequently; and, if the naked-eye appearance of the fluid and microscopy of direct smear indicated it, penicillin was given.

It was a rule to give penicillin before the results of culture and sometimes of direct smear were available. This was necessary to reduce the number of lumbar punctures in patients who were often very ill, but it meant that occasionally a patient had penicillin which in the light of subsequent findings was probably unnecessary. The cell-count alone is not always a reliable guide for therapy and must be considered with the clinical course of the disease (see below). The lumbar-puncture route was used in all these cases, but in 4 it was combined with ventricular puncture. Evidence of space-filling intracranial lesion or blockage of basal cisterns was considered an indication for ventricular puncture. Details of treatment are given in table I. It was not possible to type the pneumococci in these cases, nor were facilities available for direct in-vitro sensitivity tests; but the smear and culture results (table III) afford convincing evidence that the organisms were penicillin-sensitive.

TABLE I—DOSAGE, ROUTE, LENGTH OF TREATMENT, AND RESULTS OF INTRATHECAL PENICILLIN

Case	Single dose (units)	Route	Total dosage (units)	Hours between onset and initiation of treatment	Duration of penicillin admin. (days)	Result
1	10,000	LP	50,000	8	3 + 2	Recovery; relapse 6 days after penicillin ended.
2	10,000	LP & VP	40,000	48	2	Death in 3 days.
3	5000	LP	20,000	28	2	Died of pulmonary collapse. Necropsy: meningitis controlled.
4	5000	VP & LP	20,000	24	3	Death in 3 days.
5	10,000 / 20,000	LP & VP	200,000	18	5 + 10	Death in 21 days.
6	20,000	LP	100,000	36	3	Death in 3 days.
7	20,000 / 50,000	LP	220,000	12	9 + 4	Recovery: 17th day relapse, 8 days after ending penicillin.
8	5000 / 2500	LP & VP	25,000	48	2 + 4	Recovery.
9	10,000	LP	40,000	24	4	Recovery.
10	6000	LP	200,000	24	17	Recovery.

LP, lumbar puncture; VP, ventricular puncture.

TABLE II—PROBABLE SOURCE OF PNEUMOCOCCAL MENINGITIS

Case	Type of head injury	Region of fracture	Days between injury and onset
1	Closed	Rt petrous temporal	10
2	Closed	Rt petrous temporal	2
3	Perforating	Ethmoids	3
4	Closed	Frontal sinuses	38
5	Nil	Nil	..
6	Closed	Rt frontal sinus	2
7	Closed	None seen	104
8	Closed	Lt frontal sinus	35
9	Closed	Lt frontal sinus + ethmoids	3
10	Closed	Lt temporal-parietal	46

SOURCE OF INFECTION

The probable source of infection is indicated in table II.

In case 5 no clear source was found. This patient had a history of left aural discharge which cleared in 7 days with local treatment 15 days before the onset of meningitic symptoms. This had been diagnosed as otitis externa. When we first saw him he was grossly confused, temperature 102° F, neck a little stiff. Localising signs in the central nervous system (C.N.S.) were a reduced left abdominal reflex, an indefinite left grasp reflex, a slight left facial weakness, and 1–1½ dioptres of papilloedema. When ventriculography had shown undisplaced ventricles with slight bilateral hydrocephalus, a left radical mastoid was done by Major A. W. Kerr, S.A.M.C. A small bead of pus was found in the mastoid cells (sterile on culture), but the dura of the middle fossa appeared normal. During this illness the patient developed a bilateral partial deafness of perception type, and later a bilateral facial weakness; but this had receded somewhat at the time of death on the 21st day of illness. The necropsy of this case is detailed below.

Cases 1 and 10 had grand-mal epileptic attacks about 12 hours before the onset of clinical meningitis. Both were severe closed head injuries, and it seems possible that the epilepsy was of traumatic origin and aided the spread of infection from the fracture site, rather than that it was an early sign of meningitis.

TABLE III—BACTERIOLOGY OF C.S.F. AFTER PENICILLIN ADMINISTRATION

Case	Total units of penicillin	Last dose (units)	Hours since last dose	Smear	Culture	Power of inhibition
1	10,000	10,000	24	EC Pn	Sterile	?
	20,000	10,000	24	No organisms	Sterile	+
3	10,000	5000	6	No organisms	Sterile	+
	15,000	5000	12 (PM)	No organisms	Sterile	+
4	5000	5000	24	EC Pn	Pn +	?
	10,000	5000	24	No organisms	Sterile	+
5	10,000	10,000	18	EC + IC Pn	Pn + +	−
	40,000	10,000	48	IC Pn	Sterile	+
	70,000	20,000	24	No organisms	Sterile	−
6	20,000	20,000	24	IC Pn	Sterile	+
	60,000	20,000	24	No organisms	Sterile	+
7	10,000	10,000	24	Scanty EC Pn	Sterile	?
	50,000	20,000	24	No organisms	Sterile	−
	60,000	50,000	24	No organisms	Sterile	+
8	10,000	5000	28	No organisms	Sterile	−
	15,000	2500	24	No organisms	Sterile	−
	22,500	4500	24	No organisms	Sterile	−
	27,000	5000	24	No organisms	Sterile	−
9	10,000	10,000	24	EC and IC Pn	Pn + +	?
	20,000	10,000	18	IC Pn	Sterile	+
	40,000	10,000	24	No organisms	Sterile	?
	50,000	10,000	24	No organisms	Sterile	?

EC = extracellular. IC = intracellular. Pn = pneumococcus.

In cases 5–9 the individual results cited are not always consecutive, as bacteriological control was not always obtainable. The last result in case 7 was obtained after relapse.

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TABLE IV—CYTOLOGY OF C.S.F. AFTER PENICILLIN ADMINISTRATION

Case	Penicillin (units)	White cells (per c.mm.)	Protein (mg. per 100 c.cm.)	Hours since last dose
8	5000	1500	85	24
	2500	1150	80	24
	2500	1760	..	28
	5000	940	70	24
9	0	1600	..	..
	10,000	21,300	140	24
	10,000	7000	..	24
	10,000	1000	..	48
10	0	1404	600	..
	6000	1676	..	12
	12,000	1152	120	15
	6000	10,002	..	15
	6000	560	60	15
	6000	280	..	15
	6000	36	130	24
	6000	30	80	24
	6000	300	100	24
	6000	150	110	24
	6000	3	30	72

CLINICAL FEATURES

The onset and progress in all these cases was sudden and rapid. The detailed history of one case will illustrate the usual clinical picture.

CASE 6.—A man, aged 26, was involved in a road accident in which he was thrown forwards on his face. He was taken to a nearby field dressing-station. Half an hour after injury he was drowsy, but roused sufficiently to tell his story and show a post-traumatic amnesia of about 10 minutes. He had facial and frontal abrasions, but no C.N.S. abnormality was noted. Next morning he complained of headache and still appeared drowsy and slightly confused. However, that afternoon he was considered fit enough to evacuate to a head centre.

When he reached us about 3 hours later he was grossly confused, disoriented, uncoöperative, and restless. He presented the picture of an acute confusional insanity, and it was impossible to get any history from him. His temperature was 102·6° F, and his neck was slightly stiff. His optic disks were normal. His behaviour and occasionally his speech suggested a severe headache, so a lumbar puncture was done. A turbid yellowish-green fluid was obtained, and 20,000 units of penicillin was put into the lumbar sac at once. The fluid showed 12,050 white cells per c.mm. (80% polymorphs) and some extracellular pneumococci, and culture gave a profuse growth of pneumococci. His condition improved slightly, though he remained delirious. Lumbar puncture was repeated twice next day, and 20,000 units of penicillin was put in each time. At this time jugular compression gave a good response and there appeared to be no evidence of basal block. The

TABLE V—C.S.F. REACTION TO 10 C.CM. OF SALINE CONTAINING 10,000 UNITS OF PENICILLIN PREPARED BY A PENICILLIN TEAM AND INJECTED INTRATHECALLY WITH METAL-GLASS SYRINGES

Case	Protein (mg. per 100 c.cm.)	Cells per c.mm.			Clinical reaction
		Polymorph	Lymph	Red	
1	320	+++	+	+	+++
2	340	19,600	6	..	++
3	80	2000	100	..	++
4	35	170	35	..	+
5	340	7000	500	1200	+++
6	210	4300	350	350	+++
7	90	1500	300	..	++
8	130	1700	300	..	++
Average	190	4944			

fluid on the second day showed 11,500 white cells per c.mm. but was sterile on culture. He appeared quieter during the day and occasionally answered simple questions. No focal C.N.S. signs were present, except some blurring of his optic disks, but by the evening of the 2nd day he had a florid herpes labialis. During the night he became restless and less responsive. Lumbar puncture was repeated next morning, and jugular response was still adequate, though the rise was less brisk than previously. During the day his condition steadily deteriorated, and he died that night, the 3rd day of his illness and about 9 hours after his last lumbar puncture. His death was "cerebral" in type; he was deeply unresponsive, sweating profusely, with high pyrexia and rapid apneustic breathing. Though this was a fatal case, those that recovered showed a similar picture in the first few days of illness.

Two of these cases relapsed 6 and 8 days after ending treatment, with recurrence of organisms and pleocytosis in C.S.F. Necropsy findings on other cases suggest that these relapses may have been due to small subarachnoid or subpial collections of pus which were not sterilised by the penicillin and subsequently ruptured into the general C.S.F. It is doubtful if continued therapy would have prevented this, but it is a clear indication that the cases must be watched carefully for some weeks after ending penicillin treatment. In Cairns' series also, 2 cases are recorded as forming late localised abscesses, both of which proved fatal.

BACTERIOLOGICAL FINDINGS

In table III details are given of the findings on culture and the inhibitory power of the C.S.F. after penicillin injection. Inhibitory power was tested against a standard Oxford strain of staphylococcus. The virulence of organisms in all these cases was considered comparable on the grounds of (1) the fulminating clinical picture; (2) the profuse growth of pneumococci from the first diagnostic lumbar puncture; (3) the well-marked naked-eye opacity of all first C.S.F. specimens; (4) original white-cell counts ranging from 1000 to 2000 per c.mm. (except in case 7, which gave 12,050). The fluid was usually sterile

TABLE VI—C.S.F. REACTION TO 10 C.CM. OF SOLUTION CONTAINING 10,000 UNITS OF PENICILLIN PREPARED IN OPERATING-THEATRE AND INJECTED INTRATHECALLY WITH ALL-GLASS SYRINGES

Case	Solvent	Protein (mg. per 100 c.cm.)	Cells per c.mm.			Clinical reaction
			Polymorph	Lymph	Red	
9	Distilled water	50	160		..	±
10	Saline	30	45	7	..	+
11	Distilled water	30	9	14	..	−
12	Distilled water	22	..	2	25	−
13	Saline	15	..	..	..	−
14	Saline	35	60	32	..	−
	Average ..	30	54			

on culture after 10,000 units of penicillin. But intracellular pneumococci were noted even after 40,000 units. In view of the possibility of localised pneumococcal collections, these findings must be carefully correlated with clinical state in planning treatment. The variations in inhibitory power do not appear to follow either size of previous penicillin dose or clinical condition. Different commercial preparations of penicillin were used in this series, and this may explain the variations. The results emphasise Cairns' plea that careful bacteriological check must be kept throughout.

Table IV records in 3 cases the cell-counts and protein in C.S.F. in relation to individual penicillin dosage. In cases 8 and 9 there was a steady clinical improvement, but this is not correlated with cell-count. Table IV, which gives only the first 6 and last 5 results obtained after a series of over 20 injections in case 10, shows that the case also has a wide cell-count variation. This again was not correlated with clinical condition. Nor does this reaction seem to be related to penicillin dosage. This, together with the necropsy findings detailed below, suggested a fuller investigation of this point.

NECROPSY FINDINGS

The post-mortem findings in 3 cases are given below. In the first 2 the cause of death appeared to be the meningitis and its sequelæ. In the 3rd, the evidence suggested that the meningitis had been controlled, and death was thought to be due primarily to massive pulmonary collapse. The clinical histories of cases 5 and 6 have already been summarised.

CASE 5.—No evidence of an extradural purulent focus was found in the right or left ear or air sinuses. The mastoidectomy wound was clean, and the dura everywhere was intact. The brain was pale and œdematous, with collapsed cortical

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veins and no macroscopical evidence of cortical venous thrombosis. There was a diffuse meningitis with ventriculitis and choroiditis. The most striking feature was the collection of thick organising pus in the posterior fossa, which had matted the brain-stem and cranial nerves, especially the 7th and 8th. This must have greatly impaired the normal C.S.F. flow through the foramina of Magendie and Luschka to the supratentorial region. On section there was a slight internal hydrocephalus. No abnormality was found in other organs.

CASE 6.—The brain was soft and injected, with macroscopical evidence of an acute meningo-encephalitis. Over the cortex on both sides were patchy opacities, and a few pinhead subpial collections of pus extending superficially into the cortex. There was no cortical venous thrombosis. Again outstanding was the obstructive collection of glutinous pus in the posterior fossa. In both these cases the pus filled and obliterated the subarachnoid basal cisterns and in places was clearly visible beneath the pia also. The infection had tracked through a ¾-in. dural tear over a linear fracture extending from the right anterior ethmoid air cells to the frontal sinus. There was no evidence of pus in the air cells or ears. No abnormality was found in other organs.

CASE 3.—Gunshot wound of head. Missile had entered the right temporomandibular region and passed forwards to the anterior ethmoid cells. Radiography showed a fractured ethmoid, but no leakage of C.S.F. was apparent. His condition suggested a generalised cerebral contusion without gross focal signs in the C.N.S. He would answer questions but was drowsy, confused, and perseverating. He was given local wound toilet and for 72 hours had penicillin intramuscularly and a course of sulphadiazine. At this time his temperature began

TABLE VII—C.S.F. REACTION TO 10 C.CM. OF SOLUTION (DISTILLED WATER OR SALINE) PREPARED IN THEATRE AND INJECTED INTRATHECALLY WITH METAL-GLASS SYRINGES

Case	Solution used	Protein (mg. per 100 c.cm.)	Cells per c.mm.		Clinical reaction
			Polymorph	Lymph	
26	Saline	50	300	50	+
27	Distilled water	85	750	50	+
28	Distilled water	110	1053	47	+
29	Saline	80	321	59	+
	Average ..	86	605	52	

to rise, and he became restless and irritable. But it was not until 24 hours later that increased clouding of consciousness and neck-rigidity suggested meningitis. Penicillin was given by lumbar puncture for 2 days, and there was some reduction in temperature and general improvement. However, 6 hours after his last lumbar puncture his breathing became rapid and laboured, and he was cyanosed. Despite oxygen and endotracheal suction he died.

At *necropsy* his C.S.F. was clear and sterile on culture. The meninges showed a resolving meningitis, but no overt pus was present. The dura was torn over the ethmoid cells, but brain damage was localised and slight. There was some venous engorgement but no œdema or flattening of gyri as in cases 5 and 6. In the lungs both lower lobes were collapsed, and part of the right middle lobe was also atelectatic. It was thought that this patient would have survived his meningitis had it not been for his pulmonary condition.

COMMENT

Judging by the patients who died from the meningitis or its immediate sequelæ, it appears that elimination of active infection is not sufficient to prevent death. The considerable subarachnoid empyema in the posterior fossa and the stringy adherent pus in the ventricles and choroid rete, together with the encephalitis, must have played a part in the fatal issue. Treatment must be directed to avoiding or eliminating this collection of pus. If the pus formation is regarded as entirely a reaction to the pneumococcus, then an immediate overwhelming intrathecal dose of penicillin, given as early as possible, and if necessary repeated frequently, appears to be the best approach. We actually used a single dose of 50,000 units during the successful treatment of a relapse. But Cairns' (1944) statement, that in one of his cases a pleocytosis of 8000 per c.mm. in the C.S.F. after intrathecal

TABLE VIII—C.S.F. REACTION TO 10 C.CM. OF SOLUTION (DISTILLED WATER OR SALINE) PREPARED IN THEATRE AND INJECTED INTRATHECALLY WITH ALL-GLASS SYRINGES

Case	Solution used	Protein (mg. per 100 c.cm.)	Cells per c.mm.		Clinical reaction
			Polymorph	Lymph	
15	Distilled water	50	..	40	−
16	Distilled water	20	..	..	−
17	Saline	18	5	..	−
18	Saline	95	507	70	+
	Average ..	46	128	28	

penicillin, and a consideration of the findings in table IV suggested that a more careful investigation of the effects of penicillin in normal C.S.F. should be undertaken to ensure that penicillin itself did not play any large part in producing the picture seen at necropsy.

THECAL REACTION TO PENICILLIN

It was decided to put into the normal C.S.F. of volunteers 10,000 units of penicillin of the four commercial preparations we commonly used (Pfizer, Chemical Solvents, Squibb, and Merck), measure protein and do cell-counts, and observe the clinical reaction, if any. Since a pleocytosis has been recorded after air-replacement (Merritt and Fremont-Smith 1937) and even after the immediate replacement of C.S.F. just withdrawn, it became necessary to make sure that any reaction was due to penicillin and not to such incidental factors as the penicillin solvent.

Our first 8 tests were made with 10 c.cm. of a 1000 units per c.cm. penicillin made up by a penicillin team from commercial concentrates dissolved in sterile normal saline. We used standard Army 10 c.cm. syringes with glass barrels and metal fittings. These were kept, between use, in methylated spirit which at times appeared to be less pure than the usual civilian surgical spirit. The syringe was boiled in clean tap-water in a modern steam steriliser for 20 minutes before use. It was rinsed in sterile distilled water. The skin was prepared with ether, and a Harris's lumbar-puncture needle, treated in the same way as the syringe, was introduced with a no-touch technique. All these cases showed a well-marked pleocytosis and clinical reaction with headache, temperature, and stiff neck. The results are summarised in table V. In this and subsequent tables severity of clinical reaction is indicated by + signs: + indicates headache and stiff neck; ++ more severe headache, sometimes with vomiting; +++ pyrexia up to 102° F, vomiting,

TABLE IX—C.S.F. REACTION TO 10 C.CM. OF SOLUTION CONTAINING VARIOUS DOSES OF PENICILLIN INJECTED INTRATHECALLY WITH ALL-GLASS SYRINGES

Case	Penicillin (units)	Solvent	Where prepared	Protein (mg. per 100 c.cm.)	Cells per c.mm.			Clinical reaction
					Polymorph	Lymph	Red	
12	10,000	Distilled water	Theatre	22	..	2	25	−
13	10,000	Saline	Theatre	15	..	..	..	−
19	5000	Saline	Lab.	250	3637	363	..	++
20	5000	Saline	Lab.	280	7500	500	..	++
22	1000	Distilled water	Theatre	50	2	..	..	−
23	1000	Distilled water	Theatre	40	2	..	..	−

slight clouding of consciousness, and well-marked headache and neck rigidity. All C.S.F. results cited in tables V–IX were obtained 24 hours after the introduction of the penicillin.

A further series of 6 cases was then done in which there was a careful check on preparation and injection of solution. Instead of the previous syringes, all-glass syringes were used. Further, the preparation of the 1000 units per c.cm. penicillin was made from the manufacturers' concentrate with all possible aseptic precautions in the theatre, using all-glass syringes and needles treated as before.

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The solvent used in 3 cases was distilled water, and in 3 sterile normal saline provided by a blood-transfusion unit. All these cases had a cell reaction some 10 times less than in the first group. This is shown in table VI. The two important variables in this second group seem to be (1) all-glass instead of metal-glass syringes; (2) theatre preparation of solution. In 2 cases therefore all-glass syringes and solutions prepared by the penicillin unit were used. Brisk clinical and cell reactions developed in both (cases 19 and 20 in table IX). However, it was still felt that metal-glass syringes allowed the possibility of chemical contamination; so in a further 4 cases normal saline or distilled water prepared in the theatre was given with these syringes. All 4 had some clinical and cell reaction, though not as much as in the first series (table VII). Finally, the same solutions were given with all-glass syringes and showed no clinical and a very small cell reaction, except in 1 case where difficulty was encountered with the initial lumbar puncture (table VIII).

It is evident that penicillin itself plays little part in the cell reaction. In table VI with 10,000 units the reaction was slight. In table V with the same penicillin concentration the reaction was large. Table IX shows cell reactions with 10,000, 5000, and 1000 units of penicillin and emphasises this point. Five different commercial preparations of penicillin were used with no appreciable difference between them; the sterile water used was obtained from ampoules provided for dissolving 'Pentothal,' and the saline was that provided for intravenous therapy prepared by a blood-transfusion unit. The water and the saline were sent as a routine for bacteriological check and were always free from organisms and sterile on culture.

One case given 1000 units of penicillin in sterile water prepared in the theatre had a well-marked clinical and cell reaction. This was the only one of our cases which had such a reaction with this technique, and careful check revealed no likely source of contaminant. In view of the findings of skin-sensitivity to penicillin, this may represent an idiosyncratic reaction to the drug.

All these cases were closed head injuries whose C.S.F. was normal in cell and protein content on first examination.

DISCUSSION

The use of large intrathecal doses of penicillin seems to be safe and justifiable; but it is essential to supervise carefully the preparation and injection of the penicillin, bearing in mind the ease of contamination and the pronounced C.S.F. reaction that this may lead to. All-glass syringes should be used if possible, and all needles used to transfer solutions that will finally enter the C.S.F. should be freshly boiled.

Our cases conform to the picture of a rapidly fatal disease, and penicillin treatment should be started without waiting for bacteriological diagnosis on the basis of the clinical condition and a turbid C.S.F.

The evidence of rapid formation of pus and the possibility of local pocketing of infected pus which may cause relapse suggest that a large initial dose should be used (10,000–20,000 units) in an attempt at rapid and complete sterilisation. Frequent repetitions of smaller doses do not seem justified, seeing that each injection must carry a small risk of producing a pleocytosis.

Our findings demonstrate that cell-counts may be unreliable as a guide to further therapy. It is probable that cases 5 and 10 had treatment prolonged when it was doing no good, simply because high cell-counts were maintained or recurred. But, provided that the fullest precautions are taken, the cell-count should fall pari passu with control of infection. And a sudden rise in a falling count would be significant. In all reactions following intrathecal injections, symptoms developed in 2–4 hours after injections, and, even when severe, had cleared entirely in 24 hours; hence the clinical course of the disease—temperature, neck-rigidity, and clouding of consciousness—may still be used as a guide to treatment.

Apart from cell-count, however, examination of direct smear and culture of C.S.F. will give exact information about the control of the infection. As may be seen in table III, C.S.F. was sometimes sterile on culture while intracellular pneumococci were still seen in direct smears. The earliest sign of receding infection was the reduction or absence of healthy-looking extracellular pneumococci.

Using our earlier technique, it is undoubtedly possible that our treatment contributed to the condition found at necropsy. But with the more careful technique now evolved we do not consider that this risk would justify withholding large intrathecal doses of penicillin.

The lumbar-puncture route alone appears to be satisfactory, provided there is no evidence of blockage of C.S.F. circulation. Four of our patients who recovered were so treated, and in 3 fatal cases both lumbar and ventricular punctures were done. However, the slight added risk of ventricular puncture must certainly be taken when there is evidence of basal block or a space-filling intracranial lesion, since in such conditions diffusion of penicillin to the intracranial C.S.F. is known to be inefficient. Once the basal cisterns have become blocked it seems from the localisation of the pus that even ventricular penicillin will not always reach the site of infection, and the value of combined lumbar, cisternal, and ventricular entries must be considered.

Apart from the infection, the post-mortem appearances tempt one to search for some means of increasing C.S.F. circulation, especially through the basal cisterns. Withdrawal of much fluid from lumbar sac or cistern remains of doubtful value in view of the possibility of encouraging herniation through the tentorial hiatus or foramen magnum, especially when cerebral œdema is present, although in our experience withdrawals of 30–40 c.cm. by the lumbar route has had no untoward consequences. The patient's posture may also play a part, and we prefer to nurse them sitting up with frequent changes of position.

Nevertheless our impression in these cases and in others seen later has been that penicillin introduced early in adequate amounts into any part of the C.S.F. will produce a definite amelioration in 24–48 hours, and if this does not occur the prognosis is bad despite new portals of entry for the penicillin.

The results in this series—5 recoveries, 4 deaths, and 1 patient who died after the meningitis had been controlled—are not so favourable as those recorded by Cairns and others (1944). It is noteworthy, however, that in their 8 cases which were fully recorded penicillin treatment was started 3–28 days after the onset of meningitis. In our series it is improbable that any patient would have survived more than a few days without penicillin treatment, so a difference in the virulence of the organisms may explain the differing results.

SUMMARY

Details are given of 10 cases of pneumococcal meningitis (of which 9 followed head injury) treated with penicillin intrathecally: 5 patients recovered, 4 died, and 1 recovered from meningitis but died of other causes.

Dosage varied from 5000 to 50,000 units per dose. Lumbar and ventricular routes were used. The importance of starting treatment early is emphasised.

Observations made on the C.S.F. reactions to penicillin suggest that the pronounced pleocytosis often seen is due to factors other than penicillin itself. Preparation and administration of penicillin must therefore be most carefully supervised.

It is suggested that the C.S.F. cell-count cannot always be relied on as the main guide to further treatment.

Our thanks are due to Major J. Schorstein and Major G. K. Tutton, R.A.M.C., for details of some of the cases; to Major W. Davies, S.A.M.C., for bacteriological assistance; and to the operating-theatre staff of this unit for much help willingly given.

REFERENCES

Abrahams, E. P., Chain, E., Fletcher, C. M., Gardner, A. D., Heatley, N. G., Jennings, M. A., Florey, H. W. (1941) *Lancet*, ii, 177.
Cable, J. V. (1939) *Ibid*, ii, 73.
Cairns, H. C., Lewin, W. S., Duthie, E. S., Smith, H. V. (1944) *Ibid*, i, 655.
Chain, E., Florey, H. W., Gardner, A. D., Heatley, N. G., Jennings, M. F., Orr-Ewing, J., Sanders, A. G. (1940) *Ibid*, ii, 226.
Dowling, H. F., Dauer, C. C., Feldman, H. A., Hartmann, C. R. (1942) *New Engl. J. Med.* 226, 1015.
Fleming, A. (1929) *Brit. J. exp. Path.* 10, 226.
Hodes, H. L., Gimbel, H. S., Burnett, G. W. (1939) *J. Amer. med. Ass.* 113, 1614.
Jepson, R. P., Whitty, C. W. M. (1945) *Lancet*, ii, 751.
Keefer, C. S., Blake, F. G., Marshall, E. K. jun., Lockwood, J. S., Wood, W. B. jun. (1943) *J. Amer. med. Ass.* 122, 1217.
Merritt, H. H., Fremont-Smith, F. (1937) The Cerebrospinal Fluid, Philadelphia and London.

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ENDEMIC FLUOROSIS
IN KWEICHOW, CHINA

OLIVER LYTH
M.R.C.S., L.D.S.R.C.S.
SUPERINTENDENT OF THE METHODIST HOSPITAL, CHAOTUNG

THE area in which these investigations have been made is in the extreme western tip of the province of Kweichow in China. The nearest large town is Chaotung in the northern tip of the next province, Yunnan. The area is inhabited mainly by aboriginal tribesmen called the Miao, but other tribes and Chinese also live there; all are indiscriminately affected when exposed to fluorine. People coming from points 50 miles north and south, and 60 miles east, of Chaotung have mottling of the teeth, a condition which, though its distribution has not been accurately mapped, is known to spread in a patchy manner over a wide area.

The centres which have been most carefully investigated are two villages: P'ien p'o chai and Hai koh shan. One of the cases of spondylitis comes from Hai koh shan, and the others come from P'ien p'o chai.

In 1934 Dr. L. G. Kilborn, dean of Chengtu Medical School, visited this area and was impressed by the extensive incidence of mottled enamel and by a number of cases of spondylitis which he was asked to see. He took back samples of water. Water from a pond showed no fluorine, but one sample from a spring showed 2·4 parts per million (p.p.m.), and another from a stream 13·1 p.p.m. It was entirely due to the activities of Dr. Kilborn that the further investigations were carried forward. In 1940 he got in touch with Dr. T. S. Outerbridge, who made a house-to-house visitation of the village of P'ien p'o chai and of the two other villages on the same mountainside and found a very high incidence of mottled enamel and some advanced cases of spondylitis.

Further samples of water were sent by Dr. Outerbridge for analysis. The spring which the people of P'ien p'o chai use almost exclusively showed 5·9 p.p.m. The source for another village showed 6·3 p.p.m. This latter source is a little stream running out of a coal-mine. The whole area has deposits of coal, and often the drinking-water comes either out of or from very near a coal-mine.

CASE-RECORDS

The first 2 cases are in patients examined in their homes; the others were admitted to hospital, where a more detailed examination was possible.

CASE 1.—Chang iu, a little wizened old Miao woman, aged 60 and not more than 5 ft. tall (fig. 1), lives in great poverty. Born in another village, she moved to P'ien p'o chai when she was married at 20 years. Most of her teeth are present and show characteristic fluorotic enamel, with moderate pitting and staining (f6).

Thirty-five years ago she began to have pain in her shoulders and the upper part of her spine. At present her back is fixed, so that there is one complete curve from the occiput to the lumbar region (concave forwards). She cannot raise her head to the vertical; the only movement she can make in any part of her spine is a slight lateral rotation of the head. The knees are held flexed to counteract the anterior flexion of the spine. She has no headache, and there is no apparent enlargement of the cranium.

CASE 2.—Chang uin (fig. 2), aged 58, nephew of case 1, has lived all his life at P'ien p'o chai. He has only one remaining tooth, which is considerably worn down but shows slight pitting of the enamel.

He began to have pain in the shoulders and knees 20 years ago. About the same time he began to have headache and dizziness. Sometimes he had a sharp pain in the knees, which would almost cause him to fall down. He also had pain in the cervical region of the spine; the pain spread downwards and was accompanied by stiffness.

There is no movement at all in the spine from the 2nd cervical vertebra downwards. There is a slight kyphosis, but it is not so severe as in case 1. The head shows obvious enlargement of the cranium in proportion to the bones of the face. However, both he and Chang iu, with whom he lives, say there has not been any change in the size of his head. (They have no mirrors, and they do not wear hats.)

CASE 3.—Ch'iu shen mo is a male Chinese, aged 58, and a native of Ch'iu chia miao chai, where he has lived all his life. He uses the same spring as do the people of P'ien p'o chai. He was admitted to hospital with stiffness of the back. He dates his illness to an accident sustained 10 years ago, when, as he was climbing out of a coal-mine, some of the roof fell on his back and knocked him unconscious; he was ill for a month.

Five years ago he began to have cramp-like pains in the calves of his legs; at the same time he noted stiffness of his legs. He has no trouble in his arms. He has slight pain in the loins but no severe pain in any part of the back. He complains of limitation of movement in the neck but apparently does not note the stiffness of the other parts of the spine. Appetite and bowels normal. He is short of stature, has a slight stoop, and is well nourished.

The only movement in the whole spine takes place between C1, C2, and C3. His breathing is diaphragmatic, but with a special effort he can move the chest slightly. Even then it moves as a whole; there is no movement between the ribs. The movements of the hips and knees are normal, and there is no creaking. In the arms extension, flexion, pronation, and supination are limited. Clavicles are thickened. Teeth show moderate fluorosis. Head not enlarged. Laboratory reports show no abnormality.

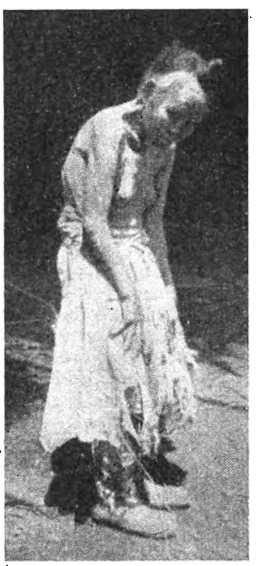

Fig. 1—Miao woman with spondylitis (case 1).

Fig. 2—Miao man with spondylitis (case 2).

On Dec. 8, 1944, when still in hospital, he fell sideways on a stone floor while squatting and fractured his spine, causing a complete flaccid paralysis of arms, trunk, and lower limbs. He was kept as still as possible on a board bed but developed pneumonia and died 5 days later.

CASE 4.—Wang min ts'u, a male Miao, aged 37, was admitted to hospital with stiffness and pain in the knees and back. He has two children and a brother all with severe dental fluorosis and the brother also has pains in the knees and severe dyspnœa brought on by exercise.

Patient has lived all his life at Hai ko shan. It has not yet been possible to analyse the water from this place, but all the children from the village have dental fluorosis.

For 10 years he has had painful knees, made worse by walking; they do not hurt at night. He also has lumbar pain, which is worse when he carries a basket on his back. He gets much pain in the back and shoulders when digging. Pains are apt to be worse in damp weather. Appetite good and bowels normal.

Patient is of normal stature and well nourished. Range of movement in the chest is not great but is within normal limits. Joints of both arms and the hips are normal, but knee-joints have crepitations. Definite restriction of move-

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ment of the spine in the dorsal region, and bending to touch the toes produces pain in the hips and lumbar spine. Patient walks with a slight stoop. Severe dental fluorosis. Laboratory reports show nothing unusual.

REPORT ON A SKELETON

Chang leh, who had lived all his life in P'ien p'o chai and had an advanced spondylitis, fell 3–4 ft. off a rock and died in 2 minutes. A necropsy was not practicable, but in 1943 I exhumed the skeleton.

Skull is broken up roughly into its component bones. The 1st cervical vertebra is ankylosed to the base of the occiput. All skull bones are of about twice the normal thickness, but there is no fusion along the joints of the cranial bones, and the joint between the two sides of the frontal bone is still present. The foramen magnum is small. The markings of the blood-vessels and sinuses and of the cerebral gyri are still visible. The bone is abnormally brittle. The diploë is not well marked, the bone having nearly the same consistence throughout. The pituitary fossa is of normal size.

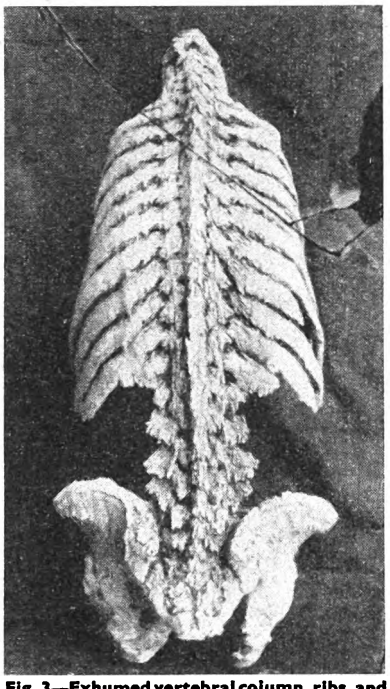

Fig. 3—Exhumed vertebral column, ribs, and pelvis, showing ankylosis and exostoses. (The black lines in the upper part of the figure are due to cracks in the photographic negative.)

The bones of the face, except the mandible, are normal. The man had 5 teeth in the upper jaw and 6 in the lower at the time of death; all of them are much eroded and have deposits of tartar which make it difficult to identify fluorotic changes. Mandible is thicker than normal, and condyles are greatly enlarged and irregular. At the point of attachment of the genioglossus and geniohyoid muscles there is a large irregular exostosis, and there are numerous smaller ones at the attachments of the digastric and internal pterygoid muscles. The hyoid bone is greatly thickened anteriorly, and the greater cornua are ankylosed to the body.

Vertebral Column.—During life the vertebral column (fig. 3) had obviously been in one piece, together with all the ribs and the pelvis. On removal from the grave the column was found to be broken between D8 and D9; but it is not known whether this fracture took place during life or afterwards.

Atlas completely ankylosed to base of occipital bone, leaving foramina for vertebral arteries. Odontoid process seems to have been separated during life from the axis and is ankylosed into the arch of the atlas. There is what appears to be a large false joint between the spinous processes of the 1st and 2nd cervical vertebræ.

Vertebræ from C2 to D8 inclusive are ankylosed together; between vertebræ C2 and C5 the spaces where the joints used to be are still just visible, though there could have been no movement in them, the interspinous and anterior vertebral ligaments being completely calcified. From C5 to D8 there is practically no sign of any joint. Spinal canal greatly narrowed, measuring not more than ¼ in. transversely and ½ in. anteroposteriorly; it is about the same size at the point of fracture between D8 and D9. On the posterior aspect the angles between the transverse processes and the spinous processes, and the spaces between the latter, are almost completely filled with bone laid down in spicules running in the line of the fibres of the dorsal muscles—i.e., downwards and outwards. Spinous processes of lower dorsal vertebræ are almost indistinguishable, being covered with a flat table of bone in the sagittal plane.

All the ribs are ankylosed firmly to the bodies of the vertebræ, transverse processes, and each other at various points to a distance of about 2 in. from the spinal column. The costal cartilages are not present and apparently were not calcified. Ribs wider than normal: both superior and inferior edges serrated.

Vertebræ from D9 to L5, sacrum, and pelvis all ankylosed together, with no sign of joints or intervertebral disks. Transverse processes of lumbar vertebræ greatly widened by spicules of bone pointing upwards and downwards. Sacro-iliac joints ankylosed and only just visible anteriorly. Pubic symphysis not closed, there being a gap of ¼ in. Superior iliac crests serrated, and posterior aspects of ilia have ridges running in the direction of the fibres of the gluteal muscles. Obturator foramina have numerous spikes of bone pointing towards their centres. Acetabula rougher than normal, and their circumferences have new bone laid down. Internal aspect of pelvis normal.

Sternum came away in one piece, including manubrium, body, and xiphoid process. Indentations at attachments of costal cartilages. Anterior aspect abnormally rough; posterior aspect only slightly roughened.

Clavicles abnormally thick, with roughenings at attachments of muscles.

Scapulæ.—Anterior aspects of scapulæ have ridges with wide grooves between them running upwards and outwards. Scapular notches converted into foramina. Posterior aspects have prominent spines of bone running upwards about ½ in. from medial borders, which have crenated ridges. Glenoid cavities roughened but have only a little new bone on their circumferences.

Humeri greatly thickened and strongly curved (convex anteriorly). Attachments of all muscles show prominent ridges. Anatomical necks completely obliterated. Lower ends of bones not so badly deformed, but there is new bone in left olecranon fossa. Heads of bones are normal except for slight ridges of bone on circumferences of joint surfaces. Joint surfaces at lower ends also show ridges on their circumferences. Right humerus thicker than left.

Ulnæ.—Coronoid processes greatly enlarged, with numerous spikes; edges of semilunar notches show well-marked ridges. Ridges for attachments of the interosseous membranes project much more than normal and have spikes on them. Lower ends of bones are slightly roughened.

Radii are thicker than normal. Heads show cap-like enlargements with free edges pointing distally. Radial tuberosities somewhat enlarged. Interosseous ridges show exostoses at attachments of adductor pollicis longus muscles. Distal articular surfaces show ridges on their circumferences.

Carpal Bones.—Those of the carpal bones which are present are normal except for very slight ridges on circumferences of articular surfaces.

Femora.—Heads greatly roughened. Necks almost obliterated by new bone extending from heads to great trochanters; new bone very irregular. Anterior surfaces of femora normally smooth except for small roughened areas distal to intertrochanteric lines. On the posterior aspects there are enormous irregular ridges of bone averaging ½ in. wide and extending from lesser trochanters to within 3 in. of lower ends of bones along lines of attachment of vastus medialis, lateralis, and adductor muscles. Ridges splay out laterally and medially and have numerous irregular spikes and ridges. Lesser trochanters enlarged and projected along lines of tendons of psoas major muscles. Lower condyles smooth but have ridges of new bone on circumferences of articular surfaces. Both epicondyles normal.

Tibiæ.—Anterior aspects of tibiæ normal. Superior articular surfaces smooth but have ridges of new bone on their circumferences. Posterior aspects show great serrated ridges between attachments of popliteus, flexor digitorum longus, and tibialis posterior muscles. Numerous ridges and spikes at attachments of other muscles. Lower articular surfaces smooth but show usual circumferential ridges.

Fibulæ generally thicker than normal, with irregular ridges along lines of attachment of intermuscular membranes.

Patellæ normal except for ridges of new bone round circumferences of articular surfaces.

Tarsal Bones.—Left calcaneus present and normal except for slight ridges round articular surfaces; talus shows same abnormality. Right navicular and third cuneiform bones joined together by a ridge of bone on their lateral aspects

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and have numerous exostoses. Metatarsal bones and phalanges show slight abnormalities, mostly in the form of excessive ridges along attachments of muscles and tendons.

Apart from fracture of odontoid process, no other bones showed definite signs of fracture during life.

A point of interest here is the cause of death, for this man's story was similar to that of case 3. The state of the skeleton seems to show that the cause of death was a dislocation of the spine between the atlas and the axis, with consequent crushing of the cord. This accident was obviously facilitated by two factors: (1) the odontoid process was already detached from the axis and fused into the arch of the atlas; and (2) though he only fell 3–4 ft. he was unable to break his fall owing to rigidity of his spine and stiffness of his joints. In case 3 it is even more obvious that the rigidity of the spine was a dangerous factor. He did little more than topple over from a squatting position; but, because his spine was in one piece, the weight of the head snapped it in the cervical region.

Another interesting point about the skeleton is the thickening of the skull, which seems to fit in with the enlargement of the head and the headache in case 2. On the other hand, this is not a constant feature and is noticeably absent from case 1.

DENTAL FLUOROSIS

The teeth of 134 people, most of them children, have been examined with the following results:

Dental fluorosis	*Cases*	
Moderate to severe	58	134
Mild	39	
None	37	

These people came from widely scattered places in the area, and each village has its own separate water-supply, usually from a spring or a stream.

In the village of Hai ko shan the teeth of all the school-children and a few other people were examined. Of 27 people all but 2 had dental fluorosis. These 2 had moved away from the village when they were a few months old, to return, one when he was 4 years old, the other when he was 7. All the other children showed opacity of the enamel, and most of them had also pitting and staining. At the village of She nu 14 were examined, and all showed mottling. Among the children 6 were found in whom the temporary teeth, usually the 2nd molars, showed dental fluorosis, the enamel being opaque, pitted, and stained.

Quantitative analysis, done by Dr. M. M. Murray, of a sound molar from a Hai ko shan patient showed that the enamel contained 0·18% fluorine and the dentine 0·22%—i.e., ten times the amount found in non-fluorine areas. One could safely forecast that the bones would contain even more.

The drinking-water from these two villages has not yet been examined for its fluorine content.

SUMMARY

A brief account is given of the discovery of endemic fluorosis in the province of Kweichow in China.

A clinical description of 4 cases of spondylitis is given, together with a description of the skeleton of a man who died after a trivial fall.

Details are given of an examination of the teeth of 134 people in the area. Signs of dental fluorosis were seen in 97.

I am indebted to Dr. T. S. Outerbridge for permission to use the information he collected; Dr. D. C. Wilson, of the Institute of Social Medicine at Oxford, Dr. M. M. Murray, of Bedford College, London, and Dr. F. H. Kemp, of the Radcliffe Infirmary, Oxford, for their help in the preparation of this paper; and Mrs. V. Stones for her help with the notes made in the field.

THE address of the Drugs Branch of the Home Office, which includes the Poisons Board, is now St. Stephen's House, Victoria Embankment, London, S.W.1 (Whitehall 8100). But applicants for import or export licences under the Dangerous Drugs Acts should still, as at present, submit their applications and fees to the finance branch at Cornwall House, Stamford Street, S.E.1.

UNSUSPECTED GENITAL TUBERCULOSIS AS A MAIN CAUSE OF TUBAL OCCLUSION

I. HALBRECHT
M.D.
From the Sterility Clinic, Tel Aviv

OCCLUSION of the fallopian tubes has long been recognised as causing from a quarter to two-thirds of the cases of female sterility, but hitherto very little progress has been made in the exact determination of the ætiology of tubal occlusion. Most writers have assumed that the main cause is gonococcal salpingitis. Since, however, this infection is rare in Palestine, and yet tubal occlusion remains one of the main causes of female sterility, the causes of occlusion were investigated as described below.

INVESTIGATION AND FINDINGS

Of 150 sterile patients examined by salpingography 48 had partial or complete tubal occlusion. Of these, in 29 both tubes were completely occluded; in 11 only one tube was occluded; and in 8 the tubes were occluded at their abdominal ends. Our radiological findings showed no particular features other than those described by all the authors.

ANALYSIS OF RESULTS OF SALPINGOGRAPHY AND ENDOMETRIAL BIOPSY

—	Complete occlusion of both tubes	Partial occlusion		Occlusion of abdominal ends of tubes	Total
		Right tube	Left tube		
Tuberculosis of the endometrium ..	10	2	0	6	18
Normal endometrium ..	19	4	5	2	30
Total ..	29	6	5	8	48

The very high incidence of endometrial tuberculosis found in our cases of sterility led us to suppose that one of the main causes of tubal occlusion might be an unsuspected tuberculosis of the fallopian tubes. Therefore all patients in whom tubal occlusion was found on salpingography or by repeated insufflations were submitted to endometrial biopsy. The results obtained confirmed our supposition: of the 48 patients examined 18 had endometrial tuberculosis. In only 1 of these did bimanual examination reveal anything suggesting genital tuberculosis. In all the others the results of bimanual examination were negative.

Further information was supplied by the past history of these patients: 2 of them had had pleurisy in their youth; 2 had had tuberculous peritonitis; and 3 others showed signs of other tuberculous affections, such as persistent pararectal fistula, tuberculous glands, and hip disease. Radiography of the lungs and estimations of the erythrocyte-sedimentation rate gave negative results, and there was no other sign of active tuberculosis.

Of the remaining 30 patients without endometrial tuberculosis, 1 developed severe pulmonary tuberculosis and 1 genital tuberculosis; 2 gave a history of appendicitis with peritonitis and 4 others of septic abortion.

COMMENTS

Genital tuberculosis in women seems to be more common than has been generally admitted in the past. It will certainly be increasingly recognised with the growing number of endometrial biopsies performed in the investigation of sterility.

Sharman (1944), in 840 endometrial biopsies performed in cases of sterility, found 44 cases of endometrial tuberculosis. Rabau et al. (1943), in 208 cases of sterility, found 20 cases of endometrial tuberculosis. Sutherland (1943), in 6385 specimens of endometrium examined histologically, found

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only 1·1% of endometrial tuberculosis, but in cases of sterility the incidence of endometrial tuberculosis was 5%.

The most outstanding feature of tuberculosis of the female genital organs seems to be its latency. Nearly all the cases of tuberculous endometritis were unsuspected, and the great majority of the affected women had no clinical symptom of tuberculosis of the endometrium and/or the tubes other than sterility.

All the workers in this field agree that the fallopian tubes are more often involved than the uterus, and the abdominal ends of the tubes are first and most extensively involved. Thus Auerbach (1942), in 571 autopsies on tuberculous females, found 52 cases of genital tuberculosis. In these the fallopian tubes were involved 49 times and the uterus only 29 times.

The only way to investigate tuberculosis of the female genital organs being endometrial biopsy, many cases of tuberculosis of the fallopian tubes will be overlooked if the uterus is not involved.

Many gynæcologists favour salpingostomy as the only logical treatment of tubal occlusion. In view of the findings that an important, if not the main, cause of tubal occlusion is genital tuberculosis, this operation may be not only useless but often harmful. The most conservative treatment, as emphasised by Goodall (1943), is the most rational in these cases. Further, all manipulations must cease not merely as soon as the diagnosis of pelvic tuberculosis is confirmed but immediately suspicion arises. Curettage or insufflation may lead to general spread of the tuberculosis. One patient died of generalised peritoneal tuberculosis two months after tubal insufflation.

Of the 30 cases without tuberculosis of the endometrium 5 gave a definite history of peritoneal inflammation. It appears likely that either the inflammation involved one or both tubes or the tubes were occluded by adhesions in their vicinity. Nothing definite can be said about the cause of the occlusion in the other 25 cases. Possibly some of them were tuberculous without the endometrium being involved, and repeated endometrial biopsies might have revealed the specific lesion in some of them.

SUMMARY

48 cases of tubal occlusion demonstrated by salpingography were investigated by biopsy. In 18 of them tuberculosis of the endometrium was found.

This result seems to warrant the suggestion that one of the main causes of tubal occlusion may be pelvic tuberculosis.

I am much indebted to Dr. J. Casper, pathologist of the Beilinson Hospital, Petach Tiquah, and Dr. Nathan, radiologist of the Kupat Cholim, Tel Aviv, for their valuable support.

REFERENCES

Auerbach, O. (1942) *Surg. Gynec. Obstet.* 75, 712.
Goodall, J. R. (1943) *J. Obstet. Gynæc.* 50, 219.
Rabau, E., Halbrecht, I., Casper, J. (1943) *J. Amer. med. Ass.* 122, 801.
Sharman, A. (1944) *J. Obstet. Gynæc.* 51, 85.
Sutherland, A. M. (1943) *Ibid.*, 50, 161.

Medical Societies

ROYAL SOCIETY OF MEDICINE

AT a joint meeting of the sections of orthopædics and surgery on Feb. 5, with Mr. W. B. FOLEY, president of the former, in the chair, a discussion on the

Treatment of Acute Osteomyelitis with Penicillin

was opened by Mr. VAUGHAN HUDSON, who described the results obtained in 37 cases treated at the Middlesex Hospital in the last 3 years. In 30 of these the infecting organism was *Staphylococcus aureus*, and in 7 *Streptococcus pyogenes*. The initial lesion, such as a boil, is easily missed and may have been healed for weeks before the osteomyelitis develops. Persistent septicæmias of unknown origin are usually the result of osteomyelitis, or, if not, may well give rise to it if left; the bony focus is often missed in fatal obscure cases. A fifth of the cases were secondary to surgical interference with an infective lesion elsewhere than in the bones. The results of penicillin therapy must be regarded with reserve, for osteomyelitis has its own vagaries and is well known for its long remissions; its severity varies from year to year and from patient to patient, with the organism alternately hibernating and regaining virulence. It is important to remember the changes in the soft tissues, including those which permeate the bony substance itself; these changes were prominent in recurrent and subacute cases. It is in the earliest stages of acute osteomyelitis that penicillin has its best chance of effecting a cure. In all cases, to begin with, only penicillin treatment was given and progress watched for a time; the systemic infection cleared up and the local condition was converted into a more chronic lesion akin to ordinary chronic osteomyelitis. In Mr. Hudson's series 34 patients took this favourable course, and 13 of these were cured with penicillin alone. In 7 cases soft-tissue abscesses formed, requiring stab drainage. In 7 bone was removed surgically during the initial chemotherapy, because of the proximity of infection to brain, tendon-sheaths, &c., but all these were capable of primary suture; and any delayed operation necessary could be done safely under penicillin cover with primary suture. In a further 7 cases, treated by drainage of the bone and soft tissues by wide incision, under penicillin protection, the worst results were obtained, 5 being left with a chronic sinus that called for radical surgery; so open drainage should be shunned as far as possible. The dosage of penicillin in the first cases was 20,000 units intramuscularly every 3 hours for 10–12 days, but each dose was later increased to 60,000 units with more success. Local penicillin gave no better results—in fact the recurrence-rate was higher. The supreme advantage of systemic penicillin is that it localises infection, allowing primary suture of operative wounds while preventing dissemination. There is also a place for its prophylactic use in the surgery of lesions such as carbuncle. In a few cases of osteomyelitis radical extirpation of infected tissue was necessary, under a penicillin umbrella. The importance of early treatment is that it limits the infection of avascular tissue, and it is precisely this that becomes insusceptible to later chemotherapy. Moreover, with early treatment it is much easier to regain functional activity since long immobilisation can then usually be avoided.

Dr. JOSEPH TRUETA surveyed 30 cases treated at the Wingfield-Morris Orthopædic Hospital, Oxford, in the previous 18 months. It was too early to assess late results, but there were no deaths, no metastases, and no joint involvement. The systemic disturbance subsided within 3–14 days, and there was complete functional restitution to normal in 28 patients. Penicillin has, in fact, so altered our standards that there is no reason to compliment oneself on a lowered case-mortality or a smaller incidence of sinuses. In early cases one can expect complete resolution and discharge from hospital with normal function in 3 weeks; and often in such cases there can be no proof of the diagnosis, apart from the original clinical observations. They started with an initial dosage of 100,000 units every 24 hours, but later increased the dose to 400,000 units the first day, 200,000 the second, and 100,000 on subsequent days. These heavily treated cases got better so much more quickly that the total dosage was no larger—in the region of 1,000,000 units all told. In half the series the infection was in the femur. Dr. Trueta and his colleagues began by trying penicillin alone, but it soon became clear that this would not always ensure a rapid complete cure, and that surgery was necessary even for fresh cases when induration indicated a subperiosteal abscess, sometimes 24 hours after commencing chemotherapy. But it was usually possible to do primary suture. The basic principle of treatment is that hæmatogenous osteomyelitis is a systemic infection, curable by penicillin. Systemic penicillin will also cure the local condition provided that there is no abscess focus, that the daily dosage is adequate, and that the penicillin is continued long enough. But systemic penicillin cannot sterilise an abscess; for this, surgical intervention is just as

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necessary as for a penicillin-resistant infection. After drainage, penicillin can prevent further pus formation, so that primary suture is possible and is desirable to forestall secondary infection of the bone. Dr. Trueta always combines drainage with drilling of the bone; 21 of his cases needed surgery, and all of these were suitable for primary suture, though this was not at first realised. Dr. Trueta commented on recent assertions that osteomyelitis can often be cured without any surgery on the bone; some of these cases develop gross progressive radiological changes which are regarded as part of the normal process of healing. He emphasised that such late radiological features do not appear in cases treated by the combination of penicillin and surgery he had outlined, and that subsequent pathological changes should be minimal. Penicillin alone can be expected to cure the early case with a small bony focus plus septicæmia; but once infiltration and elevation of the periosteum has begun avascularity in some areas is inevitable and drilling is essential. But, when this has been done, gross chronic sclerosis does not appear.

Mr. CLIVE BUTLER laid stress on the value in prognosis of a quantitative colony count in blood-cultures. Where this is of the order of 500–1000 the disease is fulminating, with death in a few days. A count around 30 is still associated with a mortality of over 50%, with death usually after 4–6 weeks from some metastatic infection. Only when the count is under 20 does the culture soon become sterile, and recovery is then the rule. Penicillin has reduced the mortality in acute osteomyelitis from 25% to 3–5%; but death can still result if diagnosis is delayed until metastatic abscess and pyæmia develop. Blood should be taken for a quantitative count at the outset. Mr. Butler gives 100,000 units of penicillin every 24 hours for 2–3 weeks, tending to continue too long rather than stop prematurely. The older practice of giving staphylococcal antitoxin has been abandoned, but small repeated blood-transfusions in the second and third weeks are still considered as valuable as ever. The local lesion must be immobilised, but not so as to interfere with easy access for examination. The infection may resolve completely, but only if treatment is begun within 2 days of the onset. Some cases go on rather typically to show extensive rarefaction without much sequestration or any abscess formation, and these must be protected carefully until properly recalcified; it is dangerous not to immobilise them in an attempt to preserve full function. Cases with subperiosteal or intramedullary abscesses show superficial fluctuation or persistent bone pain, and in these it is necessary to drain or drill the bone. In his drained cases Mr. Butler did secondary suture by the 5th to 7th day; if suture is left till later it becomes difficult and secondary infection may creep in. It is miraculous that penicillin has enabled us to progress from successive changes of stinking plasters (in those patients who survived) to having a child well-healed in bed only 3 weeks after the drainage of an acute bone infection.

"Miraculous" was a word echoed by the PRESIDENT in opening the subsequent discussion, when he contemplated the changes chemotherapy has wrought in the natural history of the disease.

Mr. R. W. BUTLER remarked that fatal cases with penicillin do not die at the same stage of the disease as formerly. They now die because they are late cases when first seen, and of some intercurrent pneumonia or pericarditis which is not amenable to chemotherapy. The radiological changes are often unlike anything familiar before, and this is probably due to the presence of small foci of necrosis with surrounding zones of hyperæmia, which can persist for quite a time. Though these appearances may often appear dubious, conservatism is always justified for they often recover extraordinarily well. What would have been taken in former days for an obvious massive sequestrum needing surgical removal may sometimes now be left with satisfactory results. Mr. Butler has noted that quiet destruction of the hip-joint sometimes occurs with penicillin treatment despite general subsidence of infection, and this was also remarked on by other speakers.

Dr. R. E. REWELL, speaking as a bacteriologist, said it is fortunate that most staphylococcal septicæmias are apparently due to penicillin-sensitive organisms. But it must be remembered that, even in these, abscesses may develop in the soft tissues; and in no case has he been able to demonstrate any penicillin content in the pus from such abscesses, though there may be a bacteriostatic level in the blood at the time. Hence surgery is still essential for these lesions.

Dr. MARTIN BODIAN discussed 24 cases treated at the Hospital for Sick Children, Great Ormond Street, with no deaths. The dosage adopted was considerably less than that mentioned by the other speakers—1000 units per pound of body-weight every 24 hours. In small children they used intermittent intramuscular injection, continued for 2 weeks. It is important to aspirate abscesses repeatedly, every day or every other day, and to replace the aspirate with penicillin solution. In only a few of the 24 cases was surgery necessary, and in all of these primary suture was possible.

AT a joint meeting of the sections of medicine and surgery on Jan. 29, with Dr. T. IZOD BENNETT in the chair, a discussion on

Chronic Cholecystitis

was opened by Dr. MAURICE SHAW. He classified cholecystitis into two groups: interstitial infection of the gall-bladder wall; and catarrhal infection, with involvement of the mucous membrane. No convincing explanation, he said, had been advanced for the flatulence of patients with this disease; gastric flatulence was due to swallowed air, but patients with cholecystitis were not aerophagists. The explanation might be excessive postural tone of the stomach with resulting tension, relieved by bringing up excess wind. In the study of the gall-bladder diathesis, skeletal formation was more important than the amount of fat. Radiology was the mainstay of diagnosis, but it was often impossible for a radiologist to say whether a gall-bladder was or was not normal. Only certain functions of the gall-bladder could be investigated radiologically, and such conditions as catarrh could not be detected. The indications for surgical treatment in established cases of cholecystitis were: the presence of stones; persistent or recurrent jaundice; and the failure of medical treatment. Moreover, most patients with suggestive symptoms and signs and no positive radiological finding apart from possibly slightly slowed emptying or failure to fill should be referred to a surgeon, though gall-bladders that did not fill might still be normal. Catarrhal cholecystitis was the type most amenable to medical treatment, which could be grouped under diet, drainage, disinfection, and drugs. There was little reason for recommending a fat-free diet, since there was no evidence that the cholesterol content of the bile was controlled by cholesterol feeding; even though the blood-cholesterol content was raised by increasing the intake, hypercholesterolæmia did not produce an increase in the biliary cholesterol content. Some patients said they could not eat fats, but this was true only of certain forms with a hard envelope, such as fried foods, which were not amenable to gastric digestion. He saw no objection to giving a normal or even high-fat diet in an attempt to make the gall-bladder contract and empty itself. The evidence that magnesium sulphate caused contraction of the gall-bladder and relaxation of the sphincter of Oddi was not complete, but the consensus of opinion favoured its use. Its introduction by the duodenal tube offered no advantage over oral administration. For disinfection, Dr. Shaw had used hexamine extensively and with some success; it was essential to keep the urine permanently alkaline and to test each specimen. He had given as much as gr. 200 without ill effect, and he favoured a single large dose each day, two hours after the last meal, which should be taken early; this was followed by magnesium sulphate in the morning. The disadvantage of giving the drug in three divided doses of gr. 100 during the day was that the gall-bladder was emptied at the next meal. Of the sulphonamides, sulphathiazole and sulphadiazine achieved significant concentrations in the bile; for estimations of the sulphonamide content, specimens of bile must be sent to the laboratory as soon as they were obtained.

Dr. J. W. D. BULL (speaking for Dr. G. T. CALTHROP) said that the site of gall-bladders thought to have been identified on plain films was seldom confirmed with cholecystography. The gall-bladder could be identified when it held calcium-containing stones; when calcium was

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deposited in the wall; and with cholecystography. The recently introduced pheniodol was the dye now usually employed; this was always given by mouth, and usually at night. The gall-bladder might concentrate and contract normally; or it might empty slowly; and the speed might vary in the same person. Was this a psychosomatic manifestation; and was the rate of bile-formation in the liver a factor? Failure of the medium to reach the gall-bladder might be due to liver failure, when the clinical picture usually established the diagnosis; or to such conditions as hepatitis; or to mechanical causes such as adhesions preventing the substance from entering the gall-bladder. Where the mucous membrane had lost its power to concentrate bile, the shadow was less dense than normal; the diminished concentration might be partial or temporary. The causes of diminished density were non-opaque calculi, an unusually large gall-bladder, inflammatory changes in the wall, and temporary vasomotor or allied disturbances. The pitfalls in radiological diagnosis were the rare congenital anomalies—absent, rudimentary, or double gall-bladders; requests for radiological examination after the gall-bladder had been removed; and improper preparation and bad technique, of which an overlying gas shadow was the most important example. Failure of the gall-bladder to fill and concentrate nearly always indicated a pathological process, but not always in the gall-bladder itself; there was no direct radiological sign of cholecystitis, and poor filling and concentration called for a second examination after an interval.

Mr. A. J. GARDHAM said cases of chronic cholecystitis could be placed in two groups: those where the diagnosis was founded on the presence of jaundice, and those without jaundice. In the latter group the patient usually complained of variable, but moderate, right upper abdominal pain; there were no signs, and X-ray examination showed normal, poor, or no filling. Failure to fill was usually due to obstruction of the cystic duct by a stone, and was therefore an indication for removal of the gall-bladder. Where the filling was decreased or normal, the gall-bladder after removal might be found to have thickened walls or a thickened mucosa, and sometimes contained cholesterin deposits. The results of cholecystectomy were consistently poor, and its only justification was that it might prevent symptoms from stones later on when the patient's constitution was not good enough to stand operation. Patients with stones must have had earlier infections, but few have previously attended a surgeon. Even severe infections, possibly with perforation, might be comparatively symptomless. Mr. Gardham maintained that mild cholecystitis without stones was not an adequate explanation of abdominal symptoms, and did not favour operation unless stones were present. The patients with jaundice presented a difficult surgical problem. Usually they came with a history of biliary colic and no radiological evidence of stones. He considered operation after the second attack with pain. If a normal gall-bladder was found at operation, its removal might be defended by the argument that it was prone to stone-formation; but in many such cases symptoms recurred after operation. He accepted dyskinesia of the biliary passages, with raised pressure in the common bile-duct and failure of the sphincter of Oddi to relax, as a probable entity, and as the explanation of pain and jaundice after removal of the gall-bladder. He did not feel happy about removing the gall-bladder when it was not grossly diseased. Peritoneoscopy should be more widely used in diagnosis; the gall-bladder could nearly always be seen with the peritoneoscope unless it was grossly diseased. The procedure was especially valuable in protracted cases of infective hepatitis; if neither the fibrotic gall-bladder usually associated with stones nor the dilated bladder commonly present with growth was found, it might be suggested that the jaundice was due to atypical infective hepatitis. This was especially helpful because operation with a large liver and jaundice was no light undertaking.

The CHAIRMAN suggested that the ultimate cause of flatulence, even in hysterics, was the sensation produced by gastric hypertonus. The effect of cholecystitis, especially with stones, on pyloric function was profound, and periduodenitis might eventually result. He was cautious about advising operation, even with stones, because the flatulent dyspepsia was so often unrelieved. He had found non-surgical biliary drainage by duodenal intubation and the instillation of 30% magnesium sulphate of great value; protracted jaundice had been cleared with this treatment. He suggested that diathermy was not used often enough.

Dr. HEWITT ATKINSON suggested that the so-called "sluggish-liver" type, with irritability, flatulence, waves of exhaustion, and a tendency to vasomotor disturbance, might be unusually prone to cholecystitis.

Dr. H. W. GILLESPIE pointed out that the extent of the shadow depended on the dose of the dye; he favoured giving a double dose. Pheniodol definitely produced a slower rate of emptying than sodium tetraiodophenolphthalein.

Dr. E. R. CULLINAN said the common causes of jaundice were liver disease and obstruction of the common bile-duct by stone. He favoured operation in the latter case.

Mr. GARDHAM emphasised that jaundice could occur by obstruction without stone, through increased pressure in the common bile-duct.

Reviews of Books

Pre-Excitation: a Cardiac Abnormality

R. F. ÖHNELL, from the Medical Clinic of Karolinska Sjukhuset. London: Kimpton. Pp. 167. 15s.

THIS monograph is one of the most complete accounts of a cardiographic anomaly which has attracted much attention since 1930 when the first collected series was published by Wolff, Parkinson, and White. It consists essentially in an alteration in the shape and width of the Q.R.S. complex and its prematurity in relation to the P wave. Dr. Öhnell discusses the various hypotheses—of which there are at least forty—put forward to explain the phenomenon, and gives good reasons for thinking that it is due, at least in some of the cases, to an additional path of conduction between auricle and ventricle. This view is supported by clinical and post-mortem studies, and by animal experiments. In one of his post-mortem cases a bridge of tissue between left auricle and left ventricle was found, and as similar structures have previously been reported this probably represents the structural basis in the congenital cases, though other explanations may apply in the acquired ones. All the clinical aspects of the condition are discussed and many curves illustrate the author's classification of the abnormal complexes. The book is difficult to read because it resembles a vast table or collection of footnotes not very clearly set out. Yet it is a work of first importance in its own field.

Pulmonary Tuberculosis and the General Practitioner

C. H. C. TOUSSAINT, M.R.C.S., D.P.H., deputy medical officer of health and clinical tuberculosis officer, Bermondsey. London: National Association for the Prevention of Tuberculosis. Pp. 12. 1s.

Dr. Toussaint's work as clinical tuberculosis officer is known far beyond the boundaries of the borough of Bermondsey. For years he and his colleagues in Southwark have been engaged in a crusade among the general practitioners in these boroughs, urging them to refer patients to the clinics for radiological examination on the first suspicion of pulmonary disease; and, what is more, showing no annoyance or impatience when the majority of cases prove to be negative. He has now produced this minute booklet for the practitioner. In 12 pages of reading matter interspersed with 8 X-ray reproductions he pleads for earlier suspicion of the disease, and supports his plea by describing five typical cases seen at the dispensaries. Two of these cases are cautionary tales of delayed diagnosis, leading to the disastrous social and economic consequences (which he specifies quite ruthlessly) attending an unnecessarily prolonged and incapacitating illness. "In active phthisis time lost can never be regained." In contrast are related three cases of early diagnosis in which there were short histories of cough and cold, or 'flu or "out of sorts"; no physical signs were found, but the medical attendants were taking no risks.

Dr. Toussaint's style is forthright and economical; the X-ray reproductions, supplied by Dr. Telfer, are exquisite; and the whole production is a piece of cool logical exposition. A shilling will be well invested in it.

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THE LANCET

LONDON : SATURDAY, FEBRUARY 16, 1946

Involuntary Self-denial

THE cries of distress over the reduction of rations in this country are understandable if perhaps a little undignified. After six years of rather boring food most people hoped for improvement during the next few months, and their hopes had a certain amount of official encouragement. After all, the traditional sequel to victory is a banquet and a higher standard of living for the victors. But we should now be old enough to know that long periods of intensive destruction do not increase wealth, and as our world grows smaller it will provide more and more evidence that abundance and scarcity, like peace and war, are "indivisible." An article in these columns a few months ago,[1] discussing the world shortage of food, suggested that if we did not choose to cut our consumption further for the sake of our European neighbours, circumstances were quite likely to take the choice out of our hands. That is what has now happened, and for some time to come our diet will be poorer through a small reduction in fat, besides being duller if we also lose our dried eggs. On the other hand, rationing of bread is at present no more than a threat, and so long as we can buy it freely there will be no shortage of food in the United Kingdom in the sense known to so many other countries —namely, a shortage of calories. Here anybody who can afford bread and potatoes—and their price is kept low by subsidies—can get as many calories as he wants, and the national daily average consumption will no doubt remain above 2800. Compared with most of the peoples of Europe and Asia we retain, even in this difficult interval between war and peace, our usual privileged position.

The immediate problem in Europe is to carry people through to the next harvest—inadequate though this may be. Mr. DEAN ACHESON, the American Under-Secretary of State, estimates that before July more than 28 million Europeans will be reduced to less than 1500 calories a day, and some to less than 1000. The Emergency Economic Committee for Europe reports that over the next few months as many as 100 million will get an average daily total of 1500 or less, while a further 400 million will have 1500–2000. These figures put our own complaints into their proper proportion. It would be wrong, however, to deduce from them that the dreaded Battle of Winter has been lost. On the contrary, thanks not least to the devotion and energy of Americans and British working for the Control Commissions and UNRRA, it should yet be won. The danger was not food shortage, which was inevitable, but famine ; and though there are areas where, for one reason or another, food is and will be very scarce, actual starvation has been almost everywhere averted. Our nearest neighbours, the French, are far from comfortable and suffer from uneven distribution ; but in Marseilles, for example, which has been badly hit, the estimated consumption last year was about 2400 calories, and no grave deterioration is probable. The people of Belgium, Holland, and Norway are getting 2300 to 2500 calories, while Denmark has a surplus. UNRRA supplies the Greeks with 1700 calories in Athens, and 1100 in rural areas, to supplement their own fish, fruit, and vegetables, which are unrationed ; Yugoslavia is not so well placed, and in some parts of Bosnia the daily ration is said to contain as little as 1200 calories. Estimates for Poland vary from something over 1500 calories a day to more than 2000, with extra for miners in certain areas at least. In Austria, Vienna is probably as badly off as anywhere, but the January ration there was 2000 calories per head, and the ration for children of up to eighteen months was raised from 1000 to 1600 calories. In the American and British zones of Germany, rations of about 1500 calories for the normal consumer (up to 3000 for miners) are being received in most places, which does not include food (perhaps an average of 200–300 calories) which they may obtain outside the ration scale. Compared with the inhabitants of some of the occupied countries, the Germans are likely to take less harm from a period of privation —provided it is brief—because during the war they kept up a high level of nutrition at the expense of others. For the countries of south-east Europe we can offer no figures, but in Hungary starvation is said to be already widespread.

Those who have been most aware of the food situation abroad have been foremost in the recent appeal to the Government not to increase rations here until they could also be increased on the Continent.[2] The PRIME MINISTER refused to give any such undertaking, but the restrictions since announced will go far to remove the discomfort of the scrupulous, for they make it plain that our reserves have really been reduced substantially and that we could not do much more without sacrifices which the public are frankly unwilling to bear. Whether the public could have been brought to another frame of mind is another question : so far there has been no appeal to altruism but merely an appearance of administrative miscalculation. Each change seems to have been made at the last moment because of the pressure of events, and even the excellent 85%-extraction loaf, which should never have been taken off the table, is reintroduced apologetically. If the cupboard is temporarily rather bare, the MINISTER OF FOOD should make more of what it does contain. Those of us with atavistic longings for a large steak may feel that we have had our fill of bread (however nutritious) and potatoes : but we should recollect that two-thirds of the population of the world derive 80% of their energy from cereals, and think themselves lucky to get it. The objection to our war-time rations is psychological more than physical : this country was accustomed to an immense choice of food, and does not get the same satisfaction from an immense choice of names for the same food. There are many blessings that we could count if we were in the mood : there is far more fish than formerly ; milk is to be comparatively plentiful this summer ; the orange, so long almost mythical, has become almost commonplace ; the first banana has come, and gone ; we are promised other fruit, fresh, dried, and tinned ; and eggs have begun to

1. *Lancet*, 1945, ii, 565.

2. See *Lancet*, Feb. 2, 1946, p. 184.

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come back in their shells just at the moment when the housewife has decided she prefers them dried. The lesson of all this is clear: if the food shortage is to continue, or even grow worse, the authorities, like good cooks, must do all they can to disguise it by variety. In so far as it is irremediable, we should like to know that our self-denial (even if involuntary) is saving lives abroad. Which indeed it is.

Treatment of Pneumococcal Meningitis

PNEUMOCOCCAL meningitis is a touchstone for chemotherapy. JEPSON and WHITTY remind us on p. 228 that the case-mortality in pre-sulphonamide days was little short of 100%. Even with sulphonamides and penicillin at our disposal, treatment is not a matter of simple routine, as SMITH, DUTHIE, and CAIRNS pointed out in our last issue. None the less they felt able to say on good evidence that the fatality-rate could be reduced to something like 10% if treatment in each case was based on close individual study. Their own results with sulphadiazine and penicillin—5 deaths in 34 fully treated cases—are sufficiently striking to call for general adoption of the methods by which they brought about this therapeutic miracle.

An important point is the correct use of sulphonamides, preferably sulphadiazine, especially during two phases of the treatment: (1) before penicillin is given, and (2) when penicillin is being withdrawn. Full doses are necessary (initial dose of 4 grammes followed by 2 g. four-hourly) and administration should start as soon as meningitis is suspected, in order to forestall the rapid deterioration which may frustrate all further measures, no matter how energetically these are applied. As early as possible, diagnostic lumbar puncture is performed and penicillin is injected intrathecally in a dose of 8000–16,000 units (strength: 2000 units per c.cm.). Sulphadiazine is continued, and a second intrathecal injection of penicillin is given twelve hours after the first; thereafter it is repeated daily for at least 5 days. At the same time intramuscular penicillin is given for 4–5 days to control the primary source of infection and the possible septicæmia. Unless the patient shows signs of intolerance, he should still receive sulphadiazine; if it has to be withdrawn it should be resumed in reduced dosage (1 g. four-hourly) for a week to cover the withdrawal of intrathecal penicillin. Improvement may be looked for after the first 24–36 hours, which is always an anxious period.

This minimum treatment will suffice for about half the cases. In others, difficulties of one kind or another should be expected, recognised, and dealt with according to their nature. The aim is to ensure that enough penicillin reaches all infected areas, and this may be far from easy. Blockage of the basal cisterns may prevent free circulation; the lumbar subarachnoid space may be obliterated; or collections of pus in the cerebral meninges may be shut off from the circulating cerebrospinal fluid, particularly in meningitis after head injury. Blockage calls for ventricular and possibly cisternal injections of penicillin, but the complication is a serious one and the best medical and surgical attempts at treatment may fail. Laboratory examination of the fluid from lumbar and ventricular taps will show if penicillin is not circulating freely or is escaping at an abnormal rate; and it is always important to have the fullest possible information about the bacteriological and cellular picture throughout the course of the illness. JEPSON and WHITTY sought to prevent localised collections of intracranial pus and cisternal blockages by larger initial doses of penicillin (10,000–20,000 units); once they gave 50,000 units without harm. SMITH, DUTHIE, and CAIRNS, however, are against large doses of penicillin because of possible harm to the cauda equina and because they doubt their value. In any case, penicillin for intrathecal use must be the purest available, and the solutions must be prepared with the greatest respect for sterility and only with pyrogen-free saline or distilled water; all-glass syringes are preferable to those made of metal and glass. On the whole, it seems likely that the meningeal irritation which sometimes follows intrathecal penicillin is not caused by the penicillin itself but by impurities, and these should not be contributed by errors of technique. It is worth noting that an increased cell-count by itself is not necessarily evidence of impending relapse. In about a third of the cases such relapse may be expected, and it must be treated at once on the same lines as the original infection. When all evidence of meningitis has disappeared and recovery is established, it will be time enough to carry out any surgical measures that may still be required to eliminate the primary source of infection—usually in the ears or nasal sinuses. Often this has been fully dealt with by the parenteral penicillin and sulphadiazine; if not, it will have been sufficiently controlled to permit of planned surgical treatment at the most suitable moment.

It is an important lesson that chemotherapeutic miracles are not wrought with drugs alone. Those who would perform them must practise the best methods known both to the science and art of medicine.

Future of Dental Surgery

WHY the teeth and their related structures are held to be outside the field of medicine has long been a mystery. Diseases of the eye or of the ear, nose, and throat are rightly regarded as belonging to medicine and surgery, and specialisation in these subjects entails the possession of at least a basic medical qualification. That a similar qualification is desirable for dentistry is recognised in the condition that dental surgeons seeking election to the honorary staff of the large teaching hospitals must also be doctors. It was in fact a tragedy that dentistry was so largely divorced from medicine. Yet the final report of the Teviot Committee,[1] though it includes much that is good and encouraging, recommends a further stage of alienation by the setting up of a separate Dental Council so as to make dentistry a self-governing profession.

The passing of the Dentists Act in 1921 meant, in effect, that nobody who was not on the dental or medical register could practise any form of dentistry. This has meant that all forms of treatment, from fillings and extractions to the fitting of artificial dentures, have been carried out by the dental surgeon. That the number of dental surgeons is at present quite insufficient to do this work is clear from the

1. Interdepartmental Committee on Dentistry (chairman, Lord Teviot). Final report, Cmd. 6727. H.M. Stationery Office. 1s. (see *Lancet*, Feb. 9, 1946, p. 206.) The interim report was summarised at length in *The Lancet*, 1944, ii, 701.

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report, which states that an annual intake of 900 students is required. The average recent pre-war figure was 340, and even this has since fallen, far below the permitted war-time quota, to less than 300. Without some radical changes in existing arrangements, therefore, the needs of the public will not be met. A far greater number of entrants to the dental profession must somehow be secured, and in order to secure them it must be made more attractive in every way. At present the dental surgeon is too often despised by his medical colleagues because of his inferior education and because dentistry is often considered more of a business and less of a profession than medicine itself. The obvious way to overcome this difficulty is to make the standard of education higher, to provide remuneration based on quality and not quantity of work, and to make it clear that dentistry is but a branch of medicine. If this is achieved, a better type of entrant, who can work on equal terms, professional and financial, with other medical practitioners will come forward.

The separation of dentistry from medicine has led to an unfortunate emphasis on its mechanical side. True, the mechanical side is of great importance. Fillings that do not stay in, and dentures that do not fit, are no good to anyone: but only too often general principles of medicine are forfeited in the quest for mechanical perfection. It is odd that, whereas the ophthalmic surgeon who does refractions sends his patient to the optician for spectacles, and the orthopædic surgeon sends his patient with an amputation to the limb-maker, the dental surgeon who removes the teeth must himself fit the denture, which is no more nor less than an artificial mechanical substitute. This fact of selling a piece of apparatus over the counter is felt by many dental surgeons to be invidious. Furthermore, as Major-General HELLIWELL points out in his minority report,[2] it is somewhat anomalous that dental surgeons who find their greatest source of income in the extraction of teeth and the provision of dentures should at the same time be expected to preserve the teeth in order to avoid these self-same extractions and dentures. Actually, what is there in the fitting of dentures that demands special knowledge of a medical type? It is of course a process requiring skill, artistic sense, and manual dexterity: but surely it could be performed by someone who has had special training in this particular work, and not necessarily one with a knowledge of the fundamental medical sciences. If this work were delegated to the denture-maker, working, if necessary, under the supervision of the dental specialist, the emphasis would at once come to lie on the preservation of the teeth by the latter and not on their replacement.

The basic problem of the dental profession might in the long run be solved, as the report suggests, by the employment of ancillary workers under the supervision of a dental specialist. In New Zealand the school dental service is mainly staffed by so-called "dental nurses," who after two years' training carry out fillings, extractions, and prophylaxis for school-children under the supervision of qualified dental officers. In 1939, with 350 of these dental nurses, the number of children under systematic treatment was 150,000. In this country during the war 50 W.A.A.F. "hygienists" have been employed to undertake scaling and oral hygiene for the Royal Air Force, thereby releasing dental surgeons for other dental work. If this principle was further extended and a medical qualification was deemed a necessity for the dental specialist, his status would be greatly enhanced. He would act as consultant, and would operate in the more difficult type of case, but would hand over most of his patients to ancillaries whose work he would supervise. Admittedly, the difficulties of reorganisation along these lines might be great, but they should not be insuperable when dentistry can be concentrated in appropriate centres where the labour can be divided among a group. A short State-subsidised course for ancillary workers, with sufficient remuneration at the end of the course, should attract enough entrants to provide a comprehensive dental service for the whole country, children and adults alike. The rapid fall in entry of students to the profession could be stopped, and the dental specialist, working with other doctors, would not only find his specialty more attractive but also be better fitted to make use of the greater opportunities for research that are advocated in the report.

2. *Ibid*, p. 49.

Annotations

STUDENT HEALTH

MANY young people working for university degrees have narrow means after their fees have been paid; and this relative poverty is reflected in poor food, poor quarters, and neglect of the early stages of disease. Medical students have expressed their concern at the conditions under which their fellows live[1] and the Royal College of Physicians has now endorsed many of their recommendations in a report on *Student Health Services*.[2] Evidence submitted to the college "leaves no doubt that there is a serious amount of sickness among university students and that there is almost a complete indifference by many university authorities to any measure of preventive medicine." The college hold that the universities must accept far greater responsibility for the health of their students.

At Aberdeen University, where undergraduates have the right to be medically examined if they wish, it has been found that over half those coming for examination are in need of medical or surgical treatment or advice on minor abnormalities, especially remediable defects of eyes and teeth. Many have mild psychological disabilities, and from other sources the committee learned that serious psychiatric disorders sometimes pass unrecognised and untreated for long periods. Sick-bays for acutely ill students may be inadequate or non-existent; and students living in lodgings may be outside any scheme for medical or nursing care, and may be so short of funds that they hesitate to call in the doctor. Their food is often unsuitable, and they have to spend money on expensive snacks because no canteen is provided for them. Even those who live in college may be offered a diet which shows no sign of expert nutritional planning. Lodgings for students living out of college are usually inspected by the university, but standards of inspection vary, and the possible effects on health are not seriously considered. In 1939 only 6 out of 31 universities and university colleges had a compulsory medical examination for students on entry, and only 4

1. Health and the Student. British Medical Students Association. 1944.
2. Third Interim Report of the Social and Preventive Medicine Committee of the Royal College of Physicians. January, 1946. The members of the committee are Prof. Alan Moncrieff (chairman), Lord Moran, F.R.C.P., Prof. M. Greenwood, F.R.S., Prof. Arthur Ellis, Dr. H. E. A. Boldero, Dr. J. A. Charles, Dr. P. M. D'Arcy Hart, Prof. Aubrey Lewis, Dr. Janet Vaughan, Sir Allen Daley, Dr. J. E. Gordon, and Prof. J. M. Mackintosh.

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had a voluntary examination; in 1943, 9 had compulsory and 2 had voluntary examinations, while "other medical services"—but never at all complete—were available in 19.

The college suggest that universities might have a standard form of application, to be filled up by parents, and accompanied by a medical certificate. All students should have a medical examination on entering the university, arranged by the authorities in association with the university department of social medicine or the staff of the local teaching hospital; and this should include an X-ray examination of the chest. The examination would not be made until the student had already been accepted by the university, and no student would be rejected on the results of examination unless he had some condition which needed temporary treatment or which would be harmful to others until remedied. In the case of other troubles, students would merely be told of the schemes for treatment; and these should certainly include dental and ophthalmic care for students during their time at the university. It should be possible to detect serious psychosis in entrants, and some form of psychological testing would provide useful material for research, since a student's performance in the tests could be related to his subsequent achievements. If some defect was found which put a university career out of the question the whole matter would have to be discussed with the parents, student, family doctor, and university authorities.

After the examination on entry, students should be examined yearly. The college consider that every residential college or hostel should have a visiting nurse, a sick-bay, and a first-aid post. Medical schools, of course, might arrange for such services to be provided in hospital. The university should make sure that medical attention is readily forthcoming to students in lodgings, but the method of providing it will have to be settled when the National Health Service has been established. Lodgings should be properly inspected by people with special experience "of the type possessed by the sanitary inspector, health visitor, and trained social worker," and any of these people could be given additional training to fit them for the task. They would study the sanitation, furnishing, ventilation, and lighting of the rooms let to students, and the cooking and diet offered. In addition the college hold that there should be university canteens and self-service cafeterias, managed by committees on which the students are represented. Profit, which should be small, ought to be spent on improving the restaurants; and a dietitian should advise on the choice of food and its cooking. A doctor appointed to supervise student health should advise on habits of work and exercise. It is to be hoped that universities will take to heart this timely advice from an authoritative source.

COMFORT IN THE HOME

IN the last few years the Ministry of Works has produced an admirable series of "Post-war Building Studies." Most of these have dealt with the technical aspects of construction, including modern principles in lighting and insulation; but the latest production—on the heating and ventilation of dwellings[1]—should command the wider attention of doctors and the general public. Under the chairmanship of Sir Alfred Egerton, a committee representing many interests—technical, industrial, and even housewifely—has reviewed the whole question of comfort in the ordinary dwelling in the light of modern knowledge and the practice in other countries which are more advanced than ours. The report is timely, not only because we are entering on the most tremendous housing programme of all history but also because we are in this respect one of the most backward of civilised countries.

1. Post-war Building Studies. No. 19, Heating and Ventilation of Dwellings. H.M. Stationery Office. 1945. 2s. 6d.

The Egerton report deals first with domestic heating as part of a national fuel policy. In 1938 there were in Great Britain some 12·5 million dwellings with about 3·7 persons to each. The quantity of coal used for domestic space-heating, water-heating, and cooking services was about 63 million tons, or 1½ tons per head. The poor insulation of our houses, and our reliance on the charming but atmosphere-polluting and grossly wasteful open fire, means that the average efficiency of domestic heating is low, probably less than 25%. A comparison with the fuel consumption in other countries, such as pre-war Germany and the United States, shows that we get far too little comfort and service for our money. Our main source of heat is coal, yet what we have of this we waste on inefficient apparatus. The warmth of the British home is confined to a narrow and often selfish circle around a single fireside. The rest of the living-space, though generous in area compared with many countries, is so cold in winter as to be barely habitable. "It is possible," the report says, "to have too much comfort, for the body may then lose its power of quick adaptation, which is an essential requirement of normal health." This danger cannot be serious in the vast majority of British houses. The term "comfort" is not defined in the report, but an ingenious instrument called the "eupatheoscope" records as a single index the three most important factors in its composition—air temperature, air movement, and radiation from the surroundings—known as the "equivalent temperature." The report suggests that most people feel comfortable within the range of 62–66° F equivalent temperature, when they are taking their ease; and that a lower figure (say 50–55° F) is enough for the housewife in action. But is it enough for the young children who will presumably be playing on the floor while she is doing her housework?

This estimate of requirements for space-heating leads the committee, logically enough, to consider the desirability of background heating in a dwelling:

> "Apart from the necessity of providing warmth to render conditions in the home comfortable it is desirable to provide against excessive chilling of the structure of the house, which causes condensation of moisture on the walls, furnishings, and household linen. Such condensation most frequently occurs when the outside temperature and humidity rise suddenly after a spell of cold weather. It is probable that a considerable amount of trouble may be avoided if the temperature inside the house is prevented from falling below about 45–50° F by providing a moderate degree of continuous warmth."

That is what is meant by "background heating." The urgent question is how it is to be secured. The standards approved in the report presuppose background heating throughout the house, maintaining throughout the twenty-four hours a minimum temperature of 45–50° F, with "topping up" to 65° F in the living-room when it is in use, and to various lower temperatures in kitchen and bedrooms according to needs. The possible combinations of appliances, for which a maze of calculations have been made, seem to boil down to these:

1. A closeable fire or semi-closed stove fitted with a convection jacket, supplying direct radiant heat and warm air to the living-room in which it is installed, and warm air, through ducts, to the bedrooms. The bedrooms would be topped up by gas or electric fires.
2. A small hot-water supply boiler providing background heating for the whole house by means of hot-water radiators, with topping up by gas or electric fires.
3. Gas or electric convectors as the main agent for background heating, with additional fires for topping up, without any solid fuel appliance.

Thus far the emphasis rests on a method of heating which provides continuous background warmth and intermittent topping up to comfort temperatures. But the issue is not so simple as that: there are at least two more alternatives. One is to rely wholly on intermittent heating; and another is to provide, like our

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neighbours in Sweden, U.S.A., and elsewhere, continuous space-heating within the comfort zone (i.e., 62–68° F equivalent temperature). Intermittent heating alone, if it is to be any improvement on our present discomforts, requires a structure of low thermal capacity and low heat transmittance. In other words, if we make walls that do not let heat through readily and do not absorb a large amount of heat, we shall be able to warm up a room in a very much shorter time than we can with our present heavy brick 11-inch cavity wall—a heavy soaker and a poor insulator. This can be done with modern methods of light construction, but it raises difficult problems of condensation, some of which have yet to be solved. It has been argued that in our fickle climate continuous heating up to the comfort zone is unnecessary and wasteful of fuel. It is certainly wasteful so long as we neglect insulation, but with modern appliances it is by no means proved that central heating (and perhaps to an even greater extent district heating) is so expensive as to be out of range for the small dwelling. With the advent of modern heating installations many of the old school will bewail the passing of the open fire. There is no need to be alarmed. Open fireplaces will no doubt continue to be provided in living-rooms even in the lowly air of Seven Dials, but where full central heating is installed they will be used as ornaments, as in other lands, to hold jars of autumn leaves.

One of the most interesting features of the report is an appendix giving the results of an inquiry by the Wartime Social Survey into the heating of dwellings. The survey covered over 5000 households in various parts of the country, with a fair sample of urban and rural areas, of differing climatic conditions, and of family groups of varying sizes. The objective studies deal with such matters as family expenditure on heating and cooking, methods employed, and habits in coal-buying and in laundry. The more important subjective factors included methods of cooking, and the likes and dislikes of housewives about heating, washing, and so on. The latter are of course subject to suspicion, because the overwhelming majority of housewives had no background of experience about many of the preferences they expressed. Needless to say, this difficulty was appreciated by the surveyors, and their report as a whole is a valuable addition to our knowledge of social conditions. One hopes that the Social Survey ("Wartime" has now been dropped from its title) will continue and extend its usefulness in peace-time, when the great housing programme will raise many problems which can be settled only by investigation in the field. Social surveys are not merely a means of discovering fact and opinion; they are also, if rightly used, an educational force of immense power.

MEDICAL SCHOOLS IN THE COLONIES

IN Britain the ratio of doctors to inhabitants is about 1 in 1000. In parts of Nigeria a medical officer may have as many as 1,000,000 in his district,[1] and the average in British tropical Africa is 100,000 to 300,000; but the doctor often has the aid of one or more locally qualified African assistants, one or more English nursing sisters, a dozen or so registered nursing orderlies who treat most of the minor sick in outpatient departments and dispensaries, usually some qualified African nurses and midwives, and finally some dozens of unregistered nursing orderlies who have acquired a modicum of skill at the district hospital. In the West Indies and Malaya the districts are smaller and have fewer inhabitants; the local people also provide more of the medical staff, and there are more private practitioners than in tropical Africa where few of the indigenous people can afford a doctor's fee. Residents from overseas, like the British in Kenya and the Indians in East Africa, have their own private doctors, but almost all the inhabitants of the younger colonies look to the State for their medical attention. This is therefore a novel experiment in State medicine. Whether in time there will be a large body of private practitioners working for the native inhabitants of the country will probably depend largely on events in Britain. Meanwhile State medicine in the colonies, operated by the Colonial Medical Service, must grow by assimilating doctors from the ranks of the people themselves.

With the exception of the West Indies, which will shortly be making their own arrangements, all the larger colonial groups already have a medical school. These are young schools; few were founded much before the first world war; in many cases their teaching hospitals are small, overcrowded, and ill equipped, and the staff cannot compare in number or in standing with those in British teaching hospitals. But these hospitals stand where only grass grew at the turn of the century; they were almost all created out of meagre local funds by doctors inexperienced in teaching; and they have succeeded in training doctors who have some grasp of their craft—all this speaks much for those who planned, for those who taught, and for those who studied. As the report of the Commission on Higher Education in the Colonies[1] reveals, these young and small medical schools vary greatly. Some grant degrees and diplomas recognised by the General Medical Council (Malta, Hong-Kong, Ceylon, and Singapore); these draw their students from communities with long histories of civilisation and city life. Other schools issue diplomas which are not recognised by the General Medical Council (Uganda, Nigeria, and Fiji); the Sudan school is in an intermediate position. The diploma from the second group usually only qualifies the recipient to practise in the government medical service; their students are drawn from peoples new to city life and civilisation. The report outlines the steps by which, given time, funds, and good will, these medical schools can be improved until they award degrees which will deserve official recognition. In the interim period the schools will enter into a special relationship with London University, under which, subject to safeguards, their students may be awarded the degrees of that university. The commission suggests that the younger medical schools and their teaching hospitals should be enlarged and modernised, the expense being met partly from local monies and partly from the Colonial Development Fund. These schools already have entrance examinations and curricula which are approaching the standard of those in Britain; they use British textbooks and all the instruction is in English; so recognition by the G.M.C., given the necessary improvements in teaching facilities, is a realisable ambition. To recognise their degrees before an adequate standard is reached will please neither those who give nor those who receive; while to delay recognition too long will provoke the local students to travel abroad to study, in Britain or elsewhere. There are now some 187 medical students from the colonies at schools in this country. In their present hard-pressed state the British schools could not much increase this number, and certainly not to an extent sufficient to meet the needs of the colonies, which, it must be remembered, have a population rather in excess of that of the British Isles.

The commission urges that an inter-university council for higher education in the colonies should be created in Britain to encourage the growth of the young colonial universities. Presumably this body could be responsible for staffing the colonial medical schools, which would no longer draw their teachers solely from officers of the Colonial Medical Service. No doubt some of its staff

1. Cmd. 6647. H.M. Stationery Office. 1945. West Africa has a separate report (Cmd. 6655), and special recommendations for the West Indies are summarised in part 3 of the main report.

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would still be recruited from that source to act as a stimulus to local talent. The commission foresees the day when the staff will be derived largely from graduates of the colonial medical schools who have done post-graduate study in Great Britain; but for some years the council must look largely to the medical schools of this country for teachers. Those who are seconded, for short or long periods, from home universities will find ample material for research, and not by any means only into tropical diseases, for the bulk of the diseases encountered in the tropics are those familiar in Britain, with variations which would well repay observation.[2]

THE OLD IN AN OVERCROWDED WORLD

THE paper by members of the Glasgow outdoor medical service which we published a fortnight ago[3] showed that "with only a little effort" something could be done to make old age a happy and useful time, and that such effort can be engrossingly interesting. At present many old people are in difficulties. When they become too feeble or ill to fend for themselves, places for them in hospitals and institutions are hard to find, and even those who can afford to pay for care may be in trouble because they cannot run a house by themselves, yet cannot get a maid, and because (as a speaker said in a discussion at Bath[4]) "hotels do not like taking elderly people who may become ill at any moment." Provincial newspapers frequently report great hardship among the elderly poor, whose failing powers are ill fitted to bear it. Thus we read[5] of an 80-year-old woman, living alone, found half conscious by the doctor; of a man of 76, bedridden, living alone; and of an arthritic woman of 55, helpless and verminous, whose landlady was unable to care for her. In both Surrey and Middlesex, the same journal says, the problem of housing those who cannot look after themselves has become urgent. Surrey has decided to spend £300,000 in buying private houses which can be converted into hospital annexes for chronically ill patients who need nursing but no medical care; and many of these will of course be old people. The annexes will be small and homely, taking about 50 patients, and, since they will be run by the parent hospital, the patients should be well nursed and medical care will be at hand.

This plan, however, will not help either those solitary old people who are getting too feeble to look after themselves, or those whose increasing senile dementia is penalising the children and grandchildren among whom they live. Many institutions for the destitute have been taken into the health service, and room in them for old people is scanty, even if removal to an institution could be regarded as the happiest solution for the destitute. They themselves still dread it, as the Glasgow review showed; and it is noteworthy that only about a third of those studied needed hospital or institutional care. Many could continue comfortably in their own homes if home-helps of a sympathetic type were provided for them. Those who undertake such work, the Glasgow writers suggest, could be outdoor staff of institutions to which the old people could be admitted either temporarily or permanently when they needed nursing. Many old people need better quarters, and many others need help in replacing or improving the equipment of their homes. Like Dr. Curran and his colleagues, we endorse the suggestion, put forward by Emily D. Samson, in *Old Age in the New World*, that local authorities should be obliged to include plans for small dwellings for old couples and solitary old people in the proportion of 10–15% of their total housing schemes. Each such dwelling should contain its bathroom and indoor water-closet, and the bath should have fixed handles for the old person to hold when getting in and out. Certainly old people should not be banished entirely to the society of their contemporaries; as one frivolous old man put it, old age is catching. They need the society of young people at times to cheer and support them; and the young need the mild tax on their sympathy and forbearance which age exacts. Nor must we go on thinking of old people—especially women who often experience a long and active old age—as socially useless. The Glasgow writers would like them to have the chance of doing productive work of an easy or interesting type, though only to the extent which pleased and satisfied them. For those who must finally be given institutional care, small homely centres, taking only a few people, serve best; and these should be near enough to their old haunts—to shops and cinemas and Woolworths—to make the change from the former life easy and supportable. The fear of being regimented, strong in our people throughout life, can become a sort of passion in the old: for though they like a routine it must be their own routine; they have little liking for discipline imposed from without, and should be spared it as much as possible.

Since nowadays even natural processes cannot escape the scrutiny of preventive medicine, the Nuffield Foundation has offered the University of Cambridge £20,000 (with a possible further £18,000) for research, under Prof. F. C. Bartlett at the psychology laboratory, into the causes and results of ageing. We may hope that in time this alternative approach may also provide knowledge that will be useful in the field.

METHOD OF PAYING ALLOWANCES

FROM next August every mother of two or more young children will be able to draw a family allowance. But there is still some uncertainty about the way in which the Government propose to distribute this money, and for that matter some of the other allowances which are to be payable under social insurance. Hitherto, the broad principle has been that a claimant (e.g., for old-age pension or war pension) selects a post-office at which he will draw the cash. In due course he receives a book of orders, which he takes to the post-office—if possible on the particular day of the week when this particular allowance falls due—and draws cash in exchange for one or more orders detached by the clerk. If amounts have not been collected in previous weeks they can be drawn in arrears, provided each order has been signed by the pensioner in the place provided, something like 13 weeks being allowed to accumulate in this way. If the claimant cannot go to the post-office a deputy can draw the money if the necessary formalities are complied with, including presentation of a certificate of physical inability to attend.

Post-offices are widely distributed among the shopping centres, and there are sub-post-offices in most villages. In theory every household must contain someone able to do ordinary marketing, and this person will be able to draw allowances at the same time. Of course, like other theories, it does not always work out ideally in practice; but up till now there has been no considerable volume of complaints. On the other hand, a busy mother with children pulling at her skirts is apt to have less leisure than an old-age pensioner, and it is to be hoped that the Minister of National Insurance will be able to make arrangements that will avoid encroaching on it further. The regulations provide for payment by means of allowance orders at a post-office, or "in such other special manner as the Minister may in any particular case and for any particular period determine." To prevent delays at the counter, the post-offices may need enlargement of staff and premises, and there might be other places from which allowances of this kind could be drawn. Perhaps, too, the mother could be given the

2. See leading article, *Lancet*, Jan. 26, 1946, p. 132.
3. Curran, M., Hamilton, J., Orr, J. S., Poole, W., Thomson, E. N. *Lancet*, Feb. 2, p. 149.
4. *Bath and Wilts Chronicle*, Dec. 4, 1945.
5. *Surrey Comet*, Dec. 22, 1945.

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option of having the money credited periodically to a post-office savings-bank account or a trustee savings-bank account.

One of the arguments advanced in favour of post-office cash payments is that the administration retains complete control of the operation and can—by a "stop" notice to the post-office counter clerk—hold up the allowance at any time if a query arises. But the proportion of cases where people would deliberately draw an allowance beyond the proper time (for example, after the death of a child) must be very small indeed, and there is a strong case for some relaxation of the standard system to enable persons who cannot easily attend at the post-office to cash their dated orders in some other way, such as through a friendly tradesman or a landlord. The orders could then be paid into a banking account like postal orders, and, if stolen or irregular, could be traced back.

The late Government, in their white-paper on Social Insurance, said that "sickness benefit will be payable, according to the claimant's choice, either by postal draft or in cash at the local office to a deputy appointed by him, but where in the circumstances of his case neither of these methods is appropriate it will be paid in cash at his home." Last week the Minister of National Insurance said he contemplated that the principal method of claiming and paying sickness benefit will be "through the post," but the system must be elastic to meet individual needs, including for instance the payment of benefit in the home. He is evidently thinking of a system whereby agents would in suitable cases take the cash to a bedridden patient, and in rural areas or in other special cases the same kind of travelling agent could perhaps be employed in taking family allowances or other payments. For this purpose it would be possible to select some local person who would not be a salaried employee of the Government but might draw a small commission—not greatly exceeding the amount of commission payable to the post-office. The agent's name and address could then for all purposes be substituted for that of the local post-office, and payment could when necessary be suspended by direct notice to him instead of the post-office. Once a system of approved agents was established there might be many ways in which they could be of service to the local community both in the distribution of claim forms and the making of payments.

INNOCENT OR MALIGNANT?

WHEN the surgeon is consulted for the first time by a patient with a cancer which is already too far advanced for a cure he often finds that the onset was so insidious that the patient saw no need for medical advice. Sometimes the patient guessed the diagnosis and was afraid of having the guess confirmed. But in yet other cases a general practitioner was consulted much earlier and could not be sure by clinical examination alone that the condition was malignant; whether because of the expense of further investigations, or because the doctor hesitated to raise unnecessary alarm, or for other reasons, he then decided to defer an opinion until developments cleared away the doubt. Such postponements may sometimes have been pardonable in the past, but they will not be so easily overlooked in the days to come. The Cancer Act makes financial provisions not only for those who definitely have cancer but also for those who are suspected of having it. The Ministry of Health [1] remarks that a high proportion of mistaken diagnoses will be a sign of keenness and even efficiency in the practitioner, and will indicate effectiveness in cancer propaganda. In many—perhaps in most—of the suspected cases the complete diagnosis will rest on histology, and it is therefore proposed to establish a panel of consultant pathologists to whom material from doubtful cases can be submitted. Such a plan will at least abolish the fear of expense as an excuse for delay. Some idea of the difficulties that arise is given by Professor Stewart [2] in his paper on conditions which may lead to a provisional diagnosis of cancer though they are eventually found by histology to be innocent. The section on lesions of the skin contains no fewer than 32 conditions, and every part of the body is considered in the same thorough manner. Altogether Stewart includes 129 different tumours whose nature is apt to be misinterpreted on clinical examination alone.

1. *Mon. Bull. Min. Hlth*, January, 1946, p. 2

POSTURAL HEART BLOCK

YET another pitfall awaits the unwary in the detection of heart disease. The Canadian Air Force [3] have reinvestigated the electrocardiograms of twenty healthy airmen who had previously [4] been found to have a prolonged P–R interval. In four of these men the prolongation only occurred when they were lying down; if they stood up the P–R interval was within normal limits. The duration of the P–R interval in these four men in the supine position was 0·28, 0·24, 0·24, and 0·40 second, while in the sitting position in all four cases it was only 0·20 second. In none of the cases was there any appreciable change in the heart-rate on change of position. In the man with the longest P–R interval (0·40 second) atropine only reduced the interval to 0·36 second, but exercise in the supine position reduced it to 0·20 second. As a control thirty men with normal P–R intervals were investigated, and in six of these a decrease of 0·02 second in the P–R interval occurred on changing from the recumbent to the sitting position, but this was accompanied by an increase in the heart-rate. Comparable findings have been reported by Holmes and Weill [5] in three apparently healthy candidates for the American Air Force. In one case the P–R interval was 0·36 second in the supine position and 0·2 second in the erect position, the comparable figures for the other two being 0·4 (supine) and 0·16 (erect), and 0·36 (supine) and 0·28 (erect). In two of the cases the change in the P–R interval was not necessarily accompanied by alteration in the ventricular rate, and in two cases atropine restored the P–R interval to normal limits, while in the third it only reduced it to 0·28 second. Pressure on the right carotid sinus and on the eyeball reduced A–V conduction time in two of these cases; exercise reduced it in all three, but in the third it only fell to 0·28 second, which was therefore taken to be the physiological lower limit of A–V conduction for this man. No evidence of heart disease could be detected in any of the three men, nor was there anything in their history to suggest cardiac damage. Manning and Stewart suggest that the changes may be due to an aberrant conduction pathway or to fluctuations in vagal tone, and it is noteworthy that their case which showed the greatest prolongation of A–V conduction later developed a duodenal ulcer. Whatever the theoretical implications of these observations, however, they certainly emphasise that considerable care should be taken in interpreting electrocardiographic findings divorced from clinical observations, and they suggest that in all patients in whom the electrocardiogram points to a partial A–V heart block the effect of posture on the electrocardiogram should be investigated.

Dr. R. D. LAWRENCE will deliver the Oliver-Sharpey lectures at the Royal College of Physicians on Tuesday and Thursday, March 19 and 21, at 5 P.M. His subject will be: A case of lipodystrophy and hepatomegaly with diabetes, lipæmia, and other strange metabolic disturbances suggesting a new aspect of insulin action.

2. Stewart, M. J. *Ibid*, p. 2.
3. Manning, G. W., Stewart, C. B. *Amer. Heart J.* 1945, **30**, 109.
4. Hall, G. E., Stewart, C. B., Manning, G. W. *Canad. med. Ass. J.* 1942, **46**, 226 (see *Lancet*, 1942, **1**, 538).
5. Holmes, J. H., Weill, D. R. jun. *Amer. Heart J.* 1945, **30**, 291.

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Special Articles

"LET'S GO TO THE PICTURES"

THE FILM IN MEDICAL EDUCATION

R. C. F. CATTERALL
F.R.C.S.

THERE is little doubt that the medical students of today, in common with many of their teachers, would like to see the cinema playing a larger part in their education than it does now, but pressed for details the majority evade the question with vague references to "Disney and all that," thus justifying the remark made by Longland and MacKeith that ". . . academic circles in England have hardly noticed this new weapon."[1]

The peculiar contribution of the cinema to education is its power of abolishing time, space, and size at the whim of the teacher. Such interference with natural phenomena is obviously open to abuse, but since much the same arguments apply to dangerous drugs and the surgeon's knife, they need not concern us here. Our object is to inquire how these powers may best be used in the clinical years of medical education.

During this stage of his training the student has two main fields of study: the amassing of factual knowledge of all sorts; and the acquisition of the various skills necessary for the proper handling of the sick. The factual knowledge is to be culled from books, from viva-voce teaching in the wards and lecture-room, and in the laboratory, with emphasis on the scientific method so far as this is possible. In all this the cinema has little to offer; the need for it varies inversely with the skill of the teacher, and in particular the film cannot answer individual students' questions. The classical and the rare and interesting cases can, however, readily be preserved (preferably in colour) for subsequent groups of students; tropical diseases can be brought home "fresh from the jungle" at the turn of a switch; and suitable snippets can be used to point a moral or adorn a tale, and sometimes even to lend verisimilitude to an otherwise bald and unconvincing narrative.

Many people learn more easily from pictures than from the printed word, but they form a minority of the school-certificate class from which medical students are drawn, and the production of factual films for the benefit of medical students is neither necessary nor desirable.

In the teaching of the practical side of our art the position of the film is very different. The skills which have to be learnt vary from the proper elicitation of physical signs, via bandaging, first-aid, and the suture of wounds, to the collection of clinicopathological specimens, auscultation, the recording of the blood-pressure, phlebotomy, intravenous infusion, the application of plaster splints—the list can be continued almost indefinitely and would properly include various minor surgical procedures such as paracentesis thoracis and catheterisation.

At present these skills are learnt by precept and example, followed by practice on patients who are already ill. The results are not satisfactory, yet with existing teaching facilities it is difficult to see how matters can be improved. It is impossible for all the surgical firm to pass a sufficient number of catheters to become adept at the art. It is very difficult to make certain that they all know how to remove sutures or examine the hip-joint. Yet it would be easy to be sure that they had all seen films of these procedures often enough to have a reasonable chance of success at their first attempt, provided that they had only the regulation number of left hands.

The demand for this type of instruction is shown by the popularity of a still-picture book on physical signs and the possibilities of the film by the I.C.I. series on the administration of anæsthetics. This type of instruction has obvious possibilities in postgraduate training, especially in operative surgery. For the clinical-year student, however, films of major operations are essentially spectacles to be shown, as at present, at film evenings in company with propaganda films, such as those produced under the auspices of the British Council and the Ministry of Health.

SOME OBJECTIONS

If the full value of the cinema in medical education is to be exploited, many new films will have to be produced, at considerable expense. Before advising this we must examine the risks of the extended use of the films. The main objection was summarised in the *Times* as

> ". . . the suspicion of those who see the cinema as the enemy of imagination. Everything is explained in too much detail, is too profusely illustrated, and the audience, left without any work of its own to do, sinks into a degrading apathy ready to accept whatever it is shown."

This is very largely true in the teaching of factual knowledge, but in attempting to impart a technical skill a certain basic uniformity of method is essential. There can only be one right way of examining a lump in the breast; there are innumerable other ways, some tolerable and others clumsy and liable to erroneous interpretation. It follows, then, that the scenario of such films would have to be agreed by all the teachers of a school or university before it was shot; but the necessary discussions among the teachers would be of benefit both to the art of medicine and to the technique of teaching itself.

A second objection is that much time would be wasted by students and teachers in seeing films two or three times for the benefit of the slower members of the group. Further, there has hitherto tended to be gross interruption of continuity of argument by blacking out the lecture theatre and in amateurish bungling with the projector, which largely offsets the advantages gained by a study of the film.

These are real objections which can only be met by proper planning in the use of films. It appears to be necessary for the lecture theatre to be blacked out, and preferably it should be air-conditioned throughout any lecture in which a film is used. The projector must be in a separate room both to minimise the running noise and to allow reloading and rewinding to take place without disturbing the smooth progress of the lecture. The lighting of the lecture theatre would be controllable from this projection room, which should also contain the epidiascope and some simple signalling device operated by the lecturer.

This is admittedly a considerable innovation; but, so long as the exhibition of teaching films is so obviously amateur, so long will the student, accustomed to look to the screen for amusement rather than education, continue to regard these films as welcome diversions from his labours instead of an integral part of his tuition.

The re-view of films in the students' own time could be arranged either at special sessions, with the times of showing advertised in advance, or by the provision in, say, the pathological museum of animated sound viewers, throwing a postcard-sized image visible in daylight and relaying the sound-track to ear-phones. This would enable two or three students at a time to collect the can of film from the shelf and view it as often as they wished. These viewers already exist in standard and substandard (16 mm.) size in America and will, it is to be hoped, shortly be available over here.

Such methods would demand more than one copy of each film, and this renders the use of the "home movie" (which only produces one copy) impossible. The cost of professionally produced films is considerable, but the demand for them should allow this cost to be shared between several schools and thus brought down to reasonable proportions. The classical or interesting case could still properly be preserved on the relatively cheap processed film, to which a commentary could be added without difficulty.

RAISING THE STANDARD

These preparations are of little value unless the standard of the films themselves is raised. It is scarcely an exaggeration to say that 90% of existing medical films are either unnecessary or unsuitable for exhibition to clinical-year students. The other 10% largely suffer from want of cutting. Most of the subjects mentioned above could be adequately covered in very few feet of film, but hitherto it has not been considered worth while to make a film which ran for less than 10 min., most of the time being spent in repetition and lengthy subtitles. This leads to another point: the vital importance of sound in the teaching film both for purposes of emphasis and to make the teaching film as comparable to the commercial film as possible, thus avoiding the necessity for any intellectual condescension on the part of the audience.

1. Longland, C. J., MacKeith, R. *Lancet*, 1944, ii, 585.

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These arguments apply with double force in the use of animated cartoon. We are accustomed to a very high standard in the commercial film, and any gross lowering of that standard, as has happened in some otherwise first-rate propaganda films on medical subjects, is apt to jar on the eye so violently that the film loses almost all its teaching value. First-class animation would have many uses, but its cost is at present prohibitive. These objections do not apply to the use of compound still diagrams or of other simply produced special effects. The production of these teaching films has already been outlined elsewhere,[2] but essentially the scenario is to be roughed out and finally approved by a teacher, who then leaves the production and shooting to a professional team with professional equipment. Some shots would have to be taken in hospital, but the moving-picture records of the future should, so far as possible, be taken, as are the still records of today, by experts in a special department.

* * *

The future of the film as a method of instruction for clinical-year medical students appears to depend on the provision both of specially made films and of the appropriate projection apparatus at the same time. It would be a great pity if the production of either of these partners was held up for lack of the other. The cinema has a real contribution to make in the medical school, but it cannot do so until all who use it cease to regard the cinema as a rather expensive toy and start thinking of it, as they now think of the radiographic department, as an essential feature of a teaching hospital whose undoubted expense is well justified by the results obtained.

RELEASE OF MEDICAL OFFICERS

STATEMENT BY THE SECRETARY OF THE CENTRAL MEDICAL WAR COMMITTEE

THE policy of the Central Medical War Committee has been to do everything in its power, by continued recruitment of doctors from civilian practice, to make possible a reasonable rate of release of medical officers in class A of the reallocation scheme. The committee is calling up all available recruits within the age limits imposed by the Government (now about 30 for general-duty officers and about 40 for specialists). During the second half of 1945 the chief problem was to find a sufficient number of new specialist recruits as substitutes for those serving specialists whose replacement was essential if they were not to be retained beyond the dates fixed for the release of medical officers generally in the same age-service groups. This problem remains and the committee is doing all that it can, with the help of the local medical war committees, to solve it. An appeal has been made in the medical press, and through the local committees, for offers of service from specialists above military age. The result of this cannot yet be judged. The committee will continue the efforts it has been making during the past year to obtain more specialists for the Services under the compulsory recruitment procedure.

A new subject of complaint among Service doctors is the inequality between the Services in the rate of release of general-duty officers. The Royal Air Force, which a short time ago was ahead of the Royal Navy and the Army, is now lagging behind. The new situation is a result of a Government decision last November to reduce the ratio of medical officers to Service personnel to two per thousand. The application of the new formula inevitably resulted in the inequality about which complaint is now being made. The Royal Air Force already had a lower ratio of medical officers than the Royal Navy and the Army, so that the additional number to be released from the R.A.F., and consequently the group numbers concerned, were less than in the other Services. The inequality is not peculiar to doctors but affects all classes of serving personnel. The white-paper stated, it may be recalled, that release would necessarily proceed at different rates in the different Services, in the different branches of a Service, and possibly even in the different trades and ranks in these branches.

The Central Medical War Committee considers, however, that the situation should, so far as possible, be remedied by varying the intake of new recruits as between the Services. In this matter the committee is in the hands of the Government, which allowed no allocation for the R.A.F. during the latter part of 1945. Recruitment to this Service has now been resumed, and the committee has recommended that the quota of new R.A.F. recruits laid down by the Government for the first half of 1946 should be materially increased. The suggestion of transferring men (not doctors only) from the R.N. to the R.A.F. to secure a more even rate of release in the two Services was rejected by the Minister of Labour in the House of Commons on Jan. 29.

2. Stanford, B. *Ibid*, 1944, ii, 588.

Public Health

Tests for Pasteurised Milks

As from March 1, pasteurised milk, whether treated by the holder process (held between 145° and 150° F for 30 minutes) or by the high-temperature short-time (H.T.S.T.) process (maintained at 162° F for at least 15 seconds), will officially be required to satisfy two tests—namely, a phosphatase test to determine whether or not it has been adequately heated, and a methylene-blue test to determine whether it is of reasonable keeping quality after pasteurisation.[1] The methylene-blue test has been so adjusted that milk passing the test as prescribed may be expected to keep overnight under fairly good household conditions of storage, and remain drinkable next morning. The old colony-count, allowing, in pasteurised milk, a maximum of 100,000 organisms per ml., which has serious drawbacks both theoretical and practical,[2] is entirely superseded.

From the laboratory standpoint neither of the new official tests is difficult, though of the two the phosphatase test probably requires more care and technical experience. It has of course been widely used for several years, and has proved satisfactory for the control of the efficiency of pasteurisation. No good modern pasteurisation plant, properly run, is likely to transgress. Experience of several years has shown that, in practice, a negative phosphatase test means that the pasteurised milk is free from pathogenic organisms of bovine origin.

The methylene-blue test for keeping quality will probably prove less easy to satisfy, particularly during the warmer months. Though milk taken *immediately* after pasteurisation from any good modern plant, holder, or H.T.S.T., has excellent keeping quality, such milk after bottling is often lamentably poor in this respect. It is to be hoped that the new prescribed methylene-blue test—which might, with advantage to the consumer, be further tightened up—will encourage designers of automatic bottling plant and of bottle-washing machines to examine their plant more critically from the standpoint of bacteriological efficiency, and so improve the performance of their future models. A very considerable improvement is required if consumers of pasteurised milk are to be saved the unnecessary annoyance and loss now so commonly caused when the atmospheric temperature rises a few degrees.

Filling Vacancies

The Ministry of Health announces the removal of war-time controls on local authorities in relation to their medical staffs. Authorities are now free to make new appointments on a permanent basis, and doctors in public-health employment are no longer required to obtain the Minister's permission to apply for new posts.

Before appointing a practitioner still liable to military service, authorities are advised to consult the Central Medical War Committee. A warning is given that there are still not enough doctors to meet existing requirements in the public-health service. It is hoped that, unless special circumstances make it inexpedient, vacancies will be advertised before they are filled.

1. Milk (Special Designations) Regulations 1946, dated Jan. 2, 1946, and Ministry of Health circular 10/46. H.M. Stationery Office, 1946, 1*d*. each.
2. Chalmers, C. H. Bacteria in Relation to the Milk Supply, 3rd ed. London, 1944, p. 169 et seq.

THE annual congress of the Ophthalmological Society of the United Kingdom will be held from May 30 to June 1 at 1, Wimpole Street, London, W.1.

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In England Now

A Running Commentary by Peripatetic Correspondents

I WAS house-surgeon to a man with personality, a question-begging epithet that we should find some difficulty in defining although we have a pretty good idea of its meaning. In his day his mannerisms secured him a notoriety far beyond the bounds of his great hospital; stories about him, true and apocryphal, were invariably exchanged in all medical circles. His ward rounds were terrifying ordeals to his dressers, who learned the art of surgery chiefly through ridicule and lacerating sarcasm. Patients were regarded as criminals or at least delinquents united in displaying an uncompromising ingratitude to a great man who, with supreme self-sacrifice and superlative charity, devoted unlimited time to their interests, qualities of which he perpetually reminded them. In the operating-theatre he swore at the nurses and through impatience or trivial frustration hurled instruments and even more fragile and weightier articles on the floor. Yet there was something in this "personality" for he ensured service and even a fair measure of admiration and hero-worship.

At the time I thought there was a good deal of the poseur in him, but looking back over the vista of thirty-five years I am not so sure. I am inclined now to think that he was naturally cruel, and liked to see people suffering, and that his fits of temper were not affected but really the outcome of loss of control, more especially as he perpetrated what I regard as the unpardonable sin—criticism and censure of his house-surgeon coram publico.

Fate, and perhaps personal inclination, made me a physician; and now when near the end of my career I believe that of the fifty young men who have served me as house-physician there has not been one who failed to enjoy his six months' appointment. Our relations have always been not those of master and pupil but of young and big brother, or of nephew and uncle perhaps. And yet I ask myself the question: Did my chief achieve more by his fortiter in re than I by my suaviter in modo? It is sometimes maintained that the era of men of outstanding personality has passed, and that we shall leave no character or characteristics by which we shall be remembered. Or is it merely that we do not see such details when we are close up, but that time is essential to establish their impressions?

* * *

In the past I have given many anæsthetics; indeed I might have become the Compleat Anæsthetist, D.A., had I been able to remember at the psychological moment (the examiner's psyche) which was the higher, the hyoid or the cricoid. I am also quite an experienced concert-goer, and I have been increasingly impressed by the affinity between anæsthetist and accompanist.

Last week, a somnolent old gentleman next to me almost developed a laryngeal stridor during the slow movement of a sonata. The violinist glared at his pianist almost as if he were personally responsible for this; and again I was reminded of the many analogues in concert and operating-theatre. True, the dopist has still not invented an apparatus quite the size of a concert-grand piano, but his art is the younger, and one can say that he has successfully passed the clavichord stage.

Watch them both at their work and see what I mean. The anæsthetist-accompanist arrives early, checks up, and prepares his instrument. It is his job to see that all is ready and in order half an hour before the arrival of the virtuoso. When all is ready and the body on the table prepared (or the body of the hall filled) the artist enters to start the operation. There is a hush as each takes up his position; now a whisper from one to the other (Schwartz's mastoidectomy, Schubert's *Wohin?*); the scalpel or the violin bow is poised in air, a nod of the head—and the music starts. Perhaps some faltering at first, a grunt from the patient, a shuffle from the hall; the ice is now broken, the fascia incised; now a growth of confidence, the patient unconscious of everything, the audience oblivious too of all but the flow of the melodic line, ideally a perfect ensemble of which the executant, accompanist, and patient-audience form the triad. From time to time the performer glances up for encouragement or approval, to give a signal; is he hacking too fast, is her rubato too pronounced? A sign from either and the tempo increases or decreases, their subject breathing automatically the while, floating in their unconscious, the third stage of the anæsthetic or the emotive force of the æsthetic. The performance nears its end; a neat row of clips, a tierce de Picardy; the audience begins to stir, it coughs; the patient stirs, he coughs (maybe he vomits, and I have known critical audiences feel like that too); the performers retire to the artists' room; the surgeon mops his brow, the singer her chest; they flop into chairs. The accompanist serves them with milk, tea, brandy, according to their taste, and the virtuoso recalls for the benefit of all present former exploits and past glories till the end of the interval.

Both anæsthetist and accompanist are expected to play down to the prima donna; their function in their theatres of action are considered to be secondary ones. Yet I have known a pianist save a grave situation, just as I have known at least one anæsthetist who can steal any surgeon's thunder with his dexterity, artistry, and charm. I have seen him save the life of a patient in spite of the surgeon's Herculean heroics, just as a gifted accompanist has saved the concert-goer from worse than death.

In addition to their occupational risks from fumes of ether and fumings of singer, the lives of both are precarious and austere; both gather the crumbs from the rich man's operating-table and both depend greatly on the caprice, displeasure, or demise of their demagogue. Both are there by the grace of the artist, tonsillar or tenor, proctologist or bass. Against the hundred guineas of their employers, their fees are measured in touches of fives and tens; both live in fear of slipping on the soprano's train, both must have a talent for unobtrusiveness and must ever be tactful, obedient, and sympathetic. Accompanists can get rid of some pent-up aggression by playing solos; anæsthetists have not got this outlet, save perhaps for a polite academic argument between the ether purists and the cycloprofane.

Wilfred Trotter is reputed to have said: "If the patient can keep awake, surely Mr. Anæsthetist you can." But how often is the gulf between surgeon and anæsthetist so wide that such an admonition is thinkable? Surgeons and singers are many, but in this pedestrian world there are few Trotters, just as there are few Menuhins, Gerharts, and Casals to inspire their satellites. In the medical service of the Army physicians, surgeons, anæsthetists, and psychiatrists have learned to rub shoulders and crowns with impunity, and they are considered of equal status. Perhaps the age of nationalisation will have some advantages after all; the man at the piano and the man at the Boyle may yet come into their own. Who knows?

* * *

To many nurses the figure 98·4° is a magnet—it is the "right" temperature, the ought-to-be-even-if-it-isn't temperature. Anything above 97° or below 99° goes on the chart as 98·4°. Anything below 97° must go down *as* 97°. Anything above 99° has a fair chance of being charted in its true magnitude.

My old professor used to say that the difference between the student nurse and the student doctor was apparent in their responses on being shown an obviously healthy patient and told, "96° is a 'collapse' temperature; this patient has a temperature of 96°." The keystone of the nurse's reaction is "There must be something wrong with the thermometer; take the temperature again." The medical student's logic leads him to the simpler conclusion: "The old man's a fool."

* * *

The peace-time breakfast table hath its surprises no less renowned than war. The other day, when I tapped the shell of a 4-min. boiled egg (imported), there was a loud pop, and, to parody the poet, "Big gassy butcher-bubbles burst in my face." The "white" was a delicate greenery-yallery. Luckily there was another egg somewhere. A week or two earlier my egg contained an ample growth of mildew. I thought this kind of thing was a figment of the music-hall artiste's imagination, but from now on I'm going to open my shell-egg ration before leaving the shop.

THE Ministry of Health announces that the control of rubber gloves will be continued. Medical practitioners can, on application to the Central Medical War Committee, obtain booklets entitling them to 6 pairs during the current year.

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Parliament

ON THE FLOOR OF THE HOUSE

MEDICUS, M.P.

IT has been a distinctly bumpy week in the House—dicey the R.A.F. call it, I believe. There have been storms over UNO, and they are at once felt in the House, which is only just over the way. There have been storms over food-supplies, and a dried-egg dust-storm which made the Minister of Food's robust outlines look hazy. As a result there is to be a debate on the world food situation. It is to be a debate on the adjournment, which does not involve a vote for or against the Government, but gives an opportunity for discussion and for airing information.

Information is indeed badly needed. One member who is anxious to send large amounts of food to Europe extracted the information, from the Prime Minister, that at the beginning of the war we had 3 million tons of food in stock (apart from retail and farm stocks) and on Dec. 31, 1945, $4\frac{1}{2}$ million tons. During 1945 1,800,000 tons of food were exported, primarily to help European countries, and it is of course essential to do so for practical reasons of health and security as well as for humanity. But it has long been known that the European food situation was serious. We were warned last autumn, and it was clear to those who knew the facts without warning, that the meat, fat, and cereal position was disquieting, and the continuance of rationing in this country certain. But recently there was a change. The Minister of Agriculture went out of his way in an address to farmers to say that he was laying stress on the production of potatoes and sugar beet but not on wheat. The Minister of Food was able to make some improvements in our rations. Then suddenly he announced the end of the dried-egg ration and other possible curtailments. The Minister of Agriculture made urgent representations and some thousands of agricultural workers due for call-up to the Forces were deferred. And now there is to be a drive for wheat which, because of the time lost, will have to be spring wheat, and there is to be a Dig for Life allotment campaign.

The House will certainly want to know what happened. On Feb. 5 both the Minister of Food and the Minister of Agriculture made statements after questions disclosing the gravity of the situation. But Sir Arthur Salter reminded the Minister of Food that as lately as Oct. 26 he had stated that he hoped and believed it would be possible to meet in full the essential needs of the world. Even bread rationing is a possibility.

Then on Feb. 6 there was the dried-egg barrage of twelve columns of quick-fire questions and supplementaries. The need to buy dried eggs is regarded by many members as so acute that they are all in favour, as dollar exchange is limited, of restrictions on American films and tobacco.

From these matters of acute individual interest, the House went on to consider the National Insurance Bill, which is in effect an agreed measure as the proposals were originally put forward in a Coalition white-paper. In his opening speech Mr. J. Griffiths impressed the House by his earnestness and grasp of detail, and Mr. Attlee, opening on the second day, was warmly received when he spoke on the wide issues of social betterment which the Bill opens up.

FROM THE PRESS GALLERY

National Insurance Bill

Mr. JAMES GRIFFITHS, in moving the second reading of the Bill, said it followed the Family Allowances Act, 1945, and the National Insurance (Industrial Injuries) Bill as the third of a series of measures to improve our standard of life. Later it was intended to introduce a further Bill dealing with assistance. To some extent, he continued, this was a Bill consolidating existing measures, but it also brought into the scheme of insurance sections of the community hitherto uncovered.

RATES OF BENEFIT

There had been a good deal of argument about adopting a subsistence basis for benefits. The Government were definitely of the view that it was undesirable as well as impracticable to have automatic adjustments. It was tried with war pensions at the end of the last war and broke down. There were individual needs which no general level of benefit could cover. Finally, the variation in rent was so wide that it was impossible to cover it completely except by supplementation.

In view of the intention of the Government to hold the cost of living at about 31% over the September, 1939, level, they decided to review the leading rates proposed in the white-paper on the basis of an overall addition of 31% instead of 25% to the basic rates as calculated by Sir William Beveridge and in the result to establish as the basic rate 42*s.* for a couple living together, with 26*s.* for a single adult for unemployment, sickness, widow's pension, and retirement pension, 16*s.* for an adult dependant, and 7*s.* 6*d.* as the child's allowance for the first child in a family.

The Minister was placed under a statutory duty to review every five years the rates of benefit payable, having regard to the expenditure necessary for the preservation of health and working capacity and to any changes of circumstances which might have taken place. This imported a new and valuable criterion into our scheme of social insurance—it was the beginning of the establishment of a national minimum standard.

SICKNESS BENEFITS

In sickness benefits a reform long overdue had been made in the shape of grants for dependants. There would also be no drop in rate and benefit as long as the incapacity continued. The loss to the nation by preventable sickness had been estimated at £300 million a year—equal to three-fifths of the cost of this scheme in the initial year—and he would advise the few who feared that we could not afford this scheme to ask themselves if we could afford to go without it.

Maternity benefits would fall under three heads. The maternity grant, payable to all mothers, continued the existing allowance paid on confinement, but was increased from £2 to £4. The attendance allowance of £1 per week for four weeks, payable to mothers not engaged in a gainful occupation, was intended to pay for domestic help immediately after childbirth. The maternity allowance was a new benefit, payable to the mothers engaged in gainful occupations and insured in their own right. It would be an allowance of 36*s.* a week for thirteen weeks (six before and seven after the birth), to enable the mother to stay away from work.

A further new benefit was the death grant, for which the Government had adopted the rates and conditions proposed in the Coalition white-paper.

Summing up, Mr. Griffiths said that he had no hesitation in saying that this scheme was the best and cheapest insurance policy ever offered to the British people.

ADMINISTRATION

Excluding payments towards the cost of the National Health Service, it was estimated that the cost will be £452 million in 1948, rising to £749 million in 1978. The Exchequer's share (excluding family allowances, industrial injuries insurance, the new National Health Service, and national assistance) was estimated at £118 million in 1948 (26%), rising to £416 million in 1978 (56%). A scheme of this magnitude must obviously be brought into operation by stages, but the Government hoped to see most of the scheme in full effect during 1948, and had undertaken to bring the new rates of retirement pension into operation before next winter.

Nothing in the Bill interfered with the duties of the Assistance Board or the public-assistance authorities to supplement benefits in cases of need at their discretion. The benefits to be provided might reduce the need for supplementation, but the power to make these supplementary awards remained untouched.

A network of regional and local offices would be set up throughout the country, working in close association with the employment exchanges. It would provide a flexible personal service to insured persons. The principal method of claiming and paying sickness benefit would be through the post. But the system must be elastic, including, for instance, the payment of benefit in the home where desirable. He hoped that ultimately the offices of the Ministry would become centres where all concerned could come freely for advice and help on all aspects of social insurance, including industrial injuries and family allowances. His department would be helped by local advisory committees and there would also be at the centre the National Insurance Advisory Committee.

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The Government had given careful thought to the future of the approved societies, but their decision remained unchanged. The sickness insurance system was part of a general scheme of social provision. If all parts of the scheme were to be properly knit together the Ministry of National Insurance responsible for administration could not divorce its work from day-to-day contacts with insured people in an important part of the field.

The scheme would have to be nurtured and safeguarded from abuse. It would have to be paid for, but the Bill, Mr. Griffiths declared, was an act of faith in the British people.

WAYS AND MEANS

Mr. R. A. BUTLER, from the front Opposition bench, supported the philosophy behind the Bill but thought it would have been much more satisfactory if the House had been able to consider the Health Services Bill before being confronted with the present measure. He trusted that the Health Services Bill would be produced with speed so that the House might see how the two measures fitted in with one another. There was no question of "giving" benefits under this Bill; the contributions were higher than those in the white-paper for the employed person, and a good deal higher for the self-employed. He agreed that the pensions proposed by the Government for those in need were fixed at a reasonable level, but the Government had decided to give pensions at a more generous level than for other sections of the population. If the Government were altering the plan from an insurance to a subsistence basis, why not have a subsistence basis for the young as well as the old? The situation in regard to children's allowances was absolutely chaotic, and the Government had been yielding to political clamour on behalf of old age.

Mr. CLEMENT DAVIES, speaking from the Liberal benches, said that the production of the country depended upon the vigour and health of the people and not upon income-tax. He welcomed the Bill, but wished that it had been one large umbrella taking everyone in without distinction of any kind. Why could not the friendly societies be brought into the scheme, he asked. Although there would now be one contribution to cover everything, sickness would have to be attended to separately. Unemployment would not need the doctor, but sickness would; and the person who attended to the sick man or the sick family ought to be someone who really knew and understood them. With all respect to the civil servants, it was not the same as contact with their fellow workers.

Sir HENRY MORRIS-JONES, while admitting that the Bill made a fine contribution to our social security, pointed out that it contained snags. The public would be mistaken if they thought they were getting a lot for nothing. Two classes of contributors in particular would get very little out of the Bill—the self-employed and the non-employed contributors. According to the Actuary, the self-employed were 14% of all the men contributors and 9% of all the women. To defer or to refuse sickness benefit for 24 days was a hardship which no Government could justify: it meant that in this group 90% of cases of sickness were not covered at all. The non-employed contributors were even worse off. They had to pay under the Bill 4*s.* 8*d.* a week and yet they got little apart from a pension after many years of payments. The sickness ratio was likely to be increased as a result of this Bill. The Government Actuary used serious and carefully chosen words concerning the possibility of enhanced sickness claims, and many medical men considered that the ratio of small illness of short duration had increased during the war. It might be that in the medical profession, as in other professions, there were black sheep, but he was sure that the proportion of medical men who would willingly give a false certificate was small. Doctors were, however, in great difficulty when required to give certificates in the case of people suffering from functional disorders and in dealing with malingerers. It might be that the Minister hoped under this Bill, and the health scheme, to have better control over the doctors in the matter of certificates, but he warned him that if he wanted the coöperation of the profession he must not try to put them into a strait jacket. He was satisfied that if the Government did not get a friendly medical profession to coöperate with them this Bill would be damned. Wonderful work had been done by the friendly-society visitors, and he wondered how the Minister was going to carry out the administrative functions of this Bill, especially in the rural areas, without the help of the local or regional friendly-society officer. It would be a serious matter for sick people to have to walk miles to see a Government official, however benevolent or fair he might be. Mr. G. S. LINDGREN, parliamentary secretary to the Ministry of National Insurance, interposed that friendly societies were not interfered with under this Bill. It was approved societies that were affected, and the difference was considerable.

Mr. C. ATTLEE, in opening the second day's debate, admitted that this measure and the Industrial Injuries Bill would cost the Exchequer some £240 million a year; but that was less than 3% of the average taxable income of the people of this country today. The only valid claim that we could not afford this Bill must rest either on there not being enough in the pool, or on the claim of some sections of society to take out so much that others must suffer want. He was not prepared to admit either of those propositions, but he agreed that the benefits of the Bill could only be secured if the people of this country recognised the obligation to work hard for them.

Sir ARTHUR SALTER said that as one of the half-dozen officials working at the Treasury when the first health insurance bill was going through the House in 1911 he knew what it was to draft a circular equally applicable and equally intelligible to a great centralised society like the Hearts of Oak and to a little village society run by the village blacksmith. But this experience had given him a picture of what local, voluntary, benevolent enterprise meant. It was a microcosm of the social life of the working classes. He realised that the voluntary system could not be applied to the whole, or even to the majority, of insured persons, but the friendly societies had a membership of eight million, and if the Minister could relieve his burden to that extent he would do well to do so.

Mr. LINDGREN, in closing the second day's debate, announced that if the self-employed contributors were willing to pay an extra sum of 4½*d.* a week, bringing up their contribution from 5*s.* 9*d.* to 6*s.* 1½*d.*, the Government would be prepared to consider favourably an amendment in committee to put these people on a level with other contributors.

QUESTION TIME

Food Reserves

Mr. R. R. STOKES asked the Prime Minister whether, in view of his recent assurance that all possible food reserves would be released for relief in Europe, and of the statement made on March 21, 1945, that these reserves amounted to 6 million tons, he would now state the total tonnage held in reserve at the outbreak of war and at Dec. 31, 1945, or later suitable date.—Mr. C. ATTLEE replied: At the outbreak of war stocks of food in the country, apart from those held by retailers and farmers, amounted approximately to 3 million tons; the comparable figure at Dec. 31, 1945, was 4·2 million tons. During 1945 stocks were reduced by 1,800,000 tons primarily to help European countries.

R.A.F. Demobilisation

Air-Commodore A. V. HARVEY asked the Under-Secretary of State for Air by what date medical officers in the R.A.F. of group 27 were being released; how this compared with their colleagues in the R.A.M.C. and in the Naval Medical Service; and what steps he is taking to make sure that there shall be no unfair discrimination against medical officers in the R.A.F.—Mr. JOHN STRACHEY replied: Medical officers in the R.A.F. in group 27 will be released in February. I understand that general-duty medical officers in the Army are being released up to group 38 by the end of February, and that their colleagues in the Naval Medical Service are now being released up to group 40. These releases all result from a Government decision that there should be 2 medical officers per 1000 men in each of the three Services. The release of our medical officers is at present up to the general average for the Royal Air Force; we cannot go faster than this because the war-time proportion of medical officers in the Air Force has been much lower than in the Army or the Navy. We are hoping for a further intake of doctors into the R.A.F. this year so that the present disparities in release can be reduced as far as possible.

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Letters to the Editor

APPOINTMENT FOR SERVICES RENDERED

SIR,—The reasoned and temperate letter of "Lieut.-Colonel, R.A.M.C." (Jan. 26) induces me to try to expand his argument. I feel that the attitude generally current towards the doctor released from the Services needs some modification. Since I, more fortunate than most of my ex-Service friends, have returned to appointments which I held before the war, I hope that my thesis can be considered on its merits, and not as the effusion of a disgruntled maladjusted man.

Great and successful efforts are being made to "rehabilitate" the ex-Service doctor. Six or less years' absence from civilian practice has left holes in our knowledge, and the help received in patching them is very welcome. The aged and the very young are not so easy to treat as the soldier, sailor, and airman. There is no need to enlarge on this fact, which is indeed quite obvious and which is fully appreciated on all sides.

Not so obvious and certainly not appreciated is something which needs saying from the other side. Because so much emphasis has been laid on our "rehabilitation" it is widely assumed that we have all been living in a professional backwater. Those of us who served a longish time know that the medical services of the Forces changed enormously between 1939 and 1945; nor is this surprising, for in them were a majority of the young and active-minded doctors. In some respects—only in some—the ex-Service doctor has leaped ahead of his friends who stayed at home. He is not only "an ex-Service doctor in need of rehabilitation": he has a great deal to contribute. The unpublished (and often unprintable) proceedings of the informal meetings of ex-Service doctors contain some pretty pungent criticisms of things accepted today by those who during the war have known no other parish than their own. Selection committees would do well in considering an ex-Service candidate to discard any feeling of sentimental sympathy and to realise instead that before them is a man who has probably lived and worked with graduates from every medical school in the Empire, and who from a varied experience can bring to an appointment a number of qualities which no "temporary" holder can provide: and then, weighing their merits, let them decide.

And perhaps in wider fields—including the Elysian fields of plans and surveys and reports—the impact of minds which have not been too immersed in the details may be actually helpful. The easy assumption is, of course, "You've been away and don't understand." We've been away, but our understanding of many things has changed since 1939. We have cursed the ineptitude of medical administration, when it was bad: but its good points shine very brightly compared with some which today govern the practice of civilian medicine, whether run by State, municipality, or private enterprise. The teachers among us have missed the undergraduate teaching, but professional and personal contact with literally hundreds of young doctors has given us a view of the subject denied to us before the war.

The last thing that any sensible man desires is a rift in our profession. Trivialities apart, there is no reason for any rift between those who did and did not serve in the Armed Forces. I write this in the conviction that if only both groups are allowed to give of their experience, that if only each will recognise the contribution of the other, our profession can extract a fresh vitality from the waste of war.

London, W.1. CECIL FLEMMING.

LOCAL ANÆSTHESIA OR ANALGESIA

SIR,—I have read with interest the query of Dr. Robert Forgan in your last issue. The term *anæsthesia* was suggested by Oliver Wendell Holmes in a personal letter to T. E. G. Morton on Nov. 21, 1846, to replace the word *letheon* which Morton applied to both ether and the effect produced by ether. Therefore the term *anæsthesia* can properly be applied only to general anæsthesia. The term *analgesia* appears to have no historical basis.

Whether, in general medicine, it is historically correct to speak of *local anæsthesia* as in the term *hysterical anæsthesia*, meaning a hysterical local loss of sensation, is debatable; but, as one of the stages of anæsthesia proper is now spoken of as *analgesia*, meaning the absence of pain in the relative presence of the other senses, it seems preferable to speak of any state in which pain is absent, but other senses present, as *analgesia*. Furthermore, the use of the word *anæsthesia*, implying loss of all sensation, and *analgesia*, loss of pain only, is etymologically correct. Obviously, absolute accuracy would demand a differentiation between *local analgesia*, meaning loss of pain sense in a particular part, and *general analgesia*, meaning general loss of pain sense; but this is unnecessarily pedantic.

The point is of some importance in the teaching of anæsthetics, and the indiscriminate use of the terms *anæsthesia* and *analgesia* is to be deprecated.

King's College Hospital, London, S.E.5. F. F. CARTWRIGHT.

NOT APPLICABLE

SIR,—One can but hope that the authorities concerned will appreciate the importance of the issues raised in your leading article of Feb. 2. I can speak, in this connexion, only for the graded dermatologists and junior dermatologists who have served, and are still serving, in the British Army, but I should like to emphasise the cogency and importance of the views you expressed.

The military dermatologists were carefully selected, trained as thoroughly as circumstances permitted (often by men who had held dermatological appointments in civilian teaching hospitals), and eventually—when fledged—were watched, encouraged, and advised by dermatologists senior to themselves. Further, because skin diseases were a cause of much sickness, the results of their work were constantly scrutinised by senior officers of the medical staffs who had to see that the temporary or permanent loss of men from combatant service was kept as low as possible.

Probably I am biased, but I believe that most of the medical officers for whose work I was responsible passed the stringent tests of practical ability with flying colours. Many of them are now released, or are awaiting release, and the majority wish to continue to practise a specialty which they like and for which they have aptitude; but they can discover only a few openings in which they can earn enough to support in modest circumstances the families they possess. A few have sufficient capital to wait to discover how imminent political events may affect their lives, but others are turning to general practice—for which, after several years of specialised experience, they are singularly unqualified.

It is not a new event in the history of this country that those who have served her in war should find her fickle in peace; therefore, to be successful, any case submitted on their behalf must not be based on the hardships of individuals but on the needs of the community. You, Sir, rightly state that the country needs specialists at least as badly as she needs general practitioners; this dictum applies to dermatology no less than to other branches of medicine. In these circumstances it seems to be desirable that the services of a number of men with training in this branch of medicine should be secured as soon as possible lest wastage occurs by their turning to openings which are less desirable, or lest inefficiency develops because of frustration and lack of opportunity to follow their chosen path.

In some quarters doubt exists whether military dermatologists who had little experience of this subject before the war are fit to undertake clinical responsibilities in civilian hospital practice; for, it is said, the range of their knowledge is very limited. Further, it has been suggested that as their work has been confined to the care of a selected group of young adult males they will not be competent to deal with maladies of women, children, and elderly persons. Those who have made these suggestions have little knowledge of the circumstances under which these officers have worked, the responsibilities they have borne, and the knowledge they have gained. I have no doubt that, given a fair opportunity, they will quickly master the particular problems which arise in the groups mentioned above, and will be eligible for many of the subordinate posts envisaged in the first interim report of the Royal College of Physicians' committee on dermatology, which was reviewed in your last issue. From what I know of

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civilian hospital practice in many parts of the country, the methods of therapy employed by these ex-soldiers will be found to be in advance of the routine practice in vogue in many areas.

For these and other reasons your reference to the creation of a pool containing those whose careers will be determined by the new health service is welcome, particularly to one who has tried in several ways to impress the need for this or some similar scheme on the highest authorities. Possibly it will not be feasible until Parliament has considered whether or not a National Health Service is to be established; but an immediate statement that such a pool will at once be formed if Parliament assents to the proposals would enable many men, who are at present undecided, to make their plans accordingly.

Liverpool. R. M. B. MACKENNA.

TUBERCULIN TESTS

SIR,—Dr. Deane's method of abrading the skin with sandpaper before applying tuberculin jelly (Feb. 2, p. 162) seems to offer a useful way of increasing the sensitivity of this test. It will be interesting to see if complete correlation with the Mantoux (1 : 1000) test is borne out in a large series of tests. I have recently been experimenting on similar lines by using single or multiple needle pricks through the superficial layers of the skin (as in one of the methods of vaccination) to try to increase the absorption of tuberculin. Most of the experiments were done, not with jelly, but with a drop of undiluted Old Tuberculin placed on the skin, the pricks being made through it. An intradermal test, however, using the same batch of tuberculin diluted 1 : 1000, proved the more reliable of the two methods. Incidentally, undiluted Old Tuberculin has excellent keeping qualities and is much cheaper to use than tuberculin jelly.

The need for a reliable and easily applied tuberculin skin-test for children might be met if some substance were found which, when used for cleansing the skin before testing, also increased its permeability to tuberculin.

Kirkcaldy. HUGH CLIMIE.

MEPACRINE AND LICHEN PLANUS

SIR,—In view of the suggestion that long-continued administration of mepacrine may be associated with an increased incidence of lichen planus,[1] the records of the West African Command may be of interest.

The table shows the number of cases of lichen planus admitted to military hospitals in the four West African Colonies from 1941 to 1945, together with the incidence per 1000 strength.

Year	European troops		African troops	
	No. of cases	Incidence per 1000 strength	No. of cases	Incidence per 1000 strength
1941 ..	2	0·34	1	0·02
1942 ..	3	0·22	4	0·05
1943 ..	1	0·07	2	0·01
1944 ..	4 (includes 1 naval case)	0·37	5	0·05
1945 ..	2 (includes 1 naval case)	0·15	5	0·09

African troops were never on suppressive mepacrine. European troops began taking mepacrine as a suppressive on March 15, 1943, and have continued ever since. Before March, 1943, the mepacrine was only employed as part of the routine treatment of malarial attacks, the usual course being not more than 0·3 g. daily for 7 days. After March, 1943, mepacrine came to be used almost exclusively for treatment as well as for suppression; quinine was administered only in cerebral cases and where there was hyperpyrexia or continued vomiting due to mepacrine. The usual period on mepacrine as a suppressive was 18 months, but many persons have taken it for from 2 to 3 years. It may therefore be claimed that the European personnel of the West African Command represents a highly mepacrinised population.

The incidence of other skin diseases which might conceivably be confused with lichen planus shows no increase after suppressive treatment was changed from quinine to mepacrine; and certainly since 1944, when confidential information about a possible association of lichen planus with mepacrine was first received, such confusion can be ruled out.

From the experience in this Command it would not be easy to claim any relationship between the incidence of lichen planus and the administration of mepacrine.

G. M. FINDLAY
Brigadier; Consulting Physician in Tropical Medicine, West Africa Command.

1. See *Lancet*, 1945, ii, 711.

DESIGN OF RAILWAY CARRIAGES

SIR,—I fully agree with all your peripatetic correspondent writes (Jan. 19) about the advantages of the American over the English type of railway coach, and I have adopted his suggestion and written to my railway company. May I now make one to him and other travelling colleagues? It is that they should expostulate, in other words make a polite remonstrance, with passengers who cough unguardedly! In my experience this is never resented and always respected. On two recent occasions persistent coughs were stopped for 1½ and 3 hours respectively—that was to the end of the journeys. I once heard a cleric start his sermon in a crowded cathedral with an appeal for no coughing; it was most effective. The Ministry of Health should add "Stop that cough! It may not be necessary" to its exhortations and send them to church and chapel, concert-hall and cinema.

Droitwich. A. R. NELIGAN.

PROSTATECTOMY

SIR,—Like Mr. Newell, my first impressions of a limited experience of retropubic prostatectomy have been very favourable, and what is, I think, most surprising is the excellent exposure of the interior of the cavity after the prostate has been removed.

However, my reason for writing is to point out how easy it is, when doing this operation, to pick up, ligate, and divide the vas as it runs up the lateral wall of the pelvis to the internal ring. This is done after the prostatic capsule has been sutured, before closing the linea alba, and obviates the separate incision required when the vas is divided at the usual site in the spermatic cord.

Wolverhampton. R. MILNES WALKER.

SIR,—In your account (Feb. 9, p. 199) of the meeting of the urological section of the Royal Society of Medicine on Jan. 31, you state that I "had had 1 death in a case where it had been impossible to return the catheter into the bladder after it had slipped out." This is an inaccurate report of what I said, and the mention of the incident separated from the context of my remarks may give the impression that the occurrence was used by me in adverse criticism of the operation.

The death referred to followed my 8th operation, under the following circumstances. The patient suffered from an old-standing cardiac dilatation and aortic disease. The operation was finished in 35 minutes and the patient's condition at its completion was considered to be eminently satisfactory. On proceeding to place the retention stitch through the catheter the latter was found to have slipped out. Great difficulty was experienced in replacing a catheter into the bladder but this was finally accomplished. The urethral manipulations, however, were followed by symptoms of severe shock. There was no response to plasma infusion and other supportive treatment, and death from cardiac failure took place 7 hours after operation. This is the sole fatality in the 23 retropubic prostatectomies which I have performed.

I take this opportunity of paying tribute to Mr. Terence Millin, to whose brilliant ingenuity we owe this new method of approach to the prostate. I believe his claim to have devised an operation that is better than the old ones is fully justified.

Glasgow. ARTHUR JACOBS.

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ORTHOTRICRESYL PHOSPHATE POISONING

SIR,—Dr. Hotston's interesting paper of Feb. 9 (p. 207) on the development of polyneuritis due to orthotricresyl phosphate poisoning refers quite briefly to recent outbreaks in Germany. I have had the opportunity of seeing a number of these cases which occurred at Eckenförde in Schleswig-Holstein. The civil population had been using the heavy oil from the German naval torpedo experimental station for cooking purposes. This oil contained appreciable amounts of the tricresyl phosphate, and a considerable number of cases of peripheral neuritis resulted. The exact figures are not known but they are certainly well over a hundred, and in one family examined four generations were afflicted.

The clinical features were not without interest, in that typically the knee-jerks were retained while the ankle-jerks were lost. This accords with Dr. Hotston's experience in the Merseyside outbreak, and is probably due to the relative intactness of the quadriceps group. Similarly the patients found more difficulty in standing erect and immobile than in walking. Spontaneous pain was not conspicuous, and superficial sensory impairment was but slight and transient, while postural loss persisted for a much longer time.

These cases are being studied by Professor Creutzfeldt of Kiel, who will no doubt eventually publish his observations.

London, W.C.1. MACDONALD CRITCHLEY.

WAR PENSIONS

SIR,—No, I have not seen the film *Burma Victory*. But I can assure Mr. J. H. Wood (Feb. 2) that I should not recommend the jungle as a health resort nor the conditions of tropical campaign as hygienically ideal. He might just as well assure me that if a man's military service is restricted to encampment on Salisbury Plain he is not likely to suffer from sandfly fever or paragomoniasis.

I have a pretty considerable experience of military service under all sorts of conditions, and I do not depart from the opinion that in general a man is better off than in civil life. I hesitate to refer to the Royal Navy, lest, while presuming the hygienic advantages of a marine life, I forget the horrors of shipwreck.

But Mr. Wood's letter has taught me a lesson—to refrain from meddling with matters of which I am ignorant. For now I learn that the royal warrant provides for the award of a pension for any disability unless the Ministry can prove that war service was not responsible for its causation or aggravation. What puzzles me is that on this interpretation of the royal warrant there can be any argument about eligibility for a pension, whatever the disease or condition on which the claim is based. Yet there is argument, any amount of argument. There must be a catch somewhere.

Mr. Wood invites (or perhaps challenges) me to tell the world "the real cause of peptic ulcer. No *theory*, please." I think not. Clearly, any "real cause" I advanced would be rejected by him as a "theory." And this would apply to a large number of diseases: in fact, the only one about which I would feel really confident is venereal disease. In my peripatetic meandering which stimulated Mr. Wood's letter I gave specious reasons why the influence of military service in its causation should entitle the sufferer to a pension. No "theory" there; yet I have very little doubt that so far the British Legion has not been importuned to support a claim. But your peripatetic correspondence is widely read and it seems not improbable that Mr. Wood will at some future date be called upon. If so, I should be most interested to learn the result.

YOUR PERIPATETIC CORRESPONDENT.

TODAY, Friday, Feb. 15, at 7 P.M., at the Beaver Hall, Garlick Hill, London, E.C.4, Mr. Herbert Morrison, Lord President of the Council, will speak at the introductory session of the conference on Science and the Welfare of Mankind, which the Association of Scientific Workers is holding in coöperation with other scientific organisations. The programme includes discussions on the Implications of Recent Scientific Developments (Feb. 16, 2.30 P.M.), the Responsibilities of Scientists in Modern Society (Feb. 17, 10 A.M.), and the Organisation of Science (Feb. 17, 2.30 P.M.).

On Active Service

CASUALTIES

KILLED

Captain WILLIAM DONALD WILSON, M.B. Lpool, R.A.M.C.

REPORTED P.O.W., NOW REPORTED DIED AS P.O.W.

Captain MARK GORDON BRAHAM, L.M.S.S.A., R.A.M.C.

AWARDS

O.B.E.

Lieut.-Colonel CYRIL BAINBRIDGE, M.B.Durh., R.A.M.C.
Lieut.-Colonel H. V. BRENNAN, M.B.E., R.A.M.C.
Lieut.-Colonel J. B. BUNDOCK, R.C.A.M.C.
Lieut.-Colonel J. C. CAIRD, M.D. Edin., R.A.M.C.
Lieut.-Colonel J. A. DAUPHINEE, R.C.A.M.C.
Lieut.-Colonel M. R. ELLIOTT, R.C.A.M.C.
Lieut.-Colonel R. S. HANDLEY, M.B.Camb., F.R.C.S., R.A.M.C.
Lieut.-Colonel SEYMOUR HEATLEY, M.B. Dubl., F.R.C.S.I., R.A.M.C.
Lieut.-Colonel F. F. HELLIER, M.D.Lond., F.R.C.P., R.A.M.C.
Lieut.-Colonel G. H. G. HOPE, M.C., M.B. Glasg., R.A.M.C.
Lieut.-Colonel D. F. HUTCHINSON, M.R.C.S., R.A.M.C.
Colonel W. D. JACKSON, M.C., M.D. Edin., R.A.M.C.
Colonel W. A. JONES, R.C.A.M.C.
Lieut.-Colonel G. A. KANE, M.B. Belf., R.A.M.C.
Lieut.-Colonel R. B. KERR, R.C.A.M.C.
Lieut.-Colonel A. G. ROSS LOWDON, M.B.Edin., R.A.M.C.
Lieut.-Colonel R. L. MACKAY, M.D. Glasg., R.A.M.C.
Lieut.-Colonel G. A. G. MITCHELL, M.B.Aberd., R.A.M.C.
Lieut.-Colonel JOHN NEILL, M.B. Edin., R.A.M.C.
Colonel A. R. ORAM, M.C., M.B. N.U.I., R.A.M.C.
Colonel R. W. RICHARDSON, E.D., R.C.A.M.C.
Colonel C. C. ROSS, R.C.A.M.C.
Lieut.-Colonel ROBERT RUTHERFORD, F.R.C.S., R.A.M.C.
Lieut.-Colonel K. G. W. SAUNDERS, F.R.C.S.E., R.A.M.C.
Lieut.-Colonel F. L. SHIPP, R.C.A.M.C.
Lieut.-Colonel HENRY SISSONS, M.R.C.S., R.A.M.C.
Lieut.-Colonel J. M. TAIT, M.D. Durh., R.A.M.C.
Lieut.-Colonel F. W. WARREN, L.R.C.P.I., R.A.M.C.
Colonel G. E. WIGHT, R.C.A.M.C.

M.B.E.

Major IVOR AUBREY, M.C., M.R.C.S., R.A.M.C.
Major S. O. AYLETT, M.B. Lond., F.R.C.S., R.A.M.C.
Major RONALD BARRACLOUGH, M.B. Aberd., R.A.M.C.
Major W. F. BIE, R.C.A.M.C.
Major JOHN BLEAKLEY, M.B. Lond., R.A.M.C.
Major P. W. H. BLEASDALE, M.B. Edin., R.A.M.C.
Major J. A. C. BURRIDGE, M.R.C.S., R.A.M.C.
Major G. B. CARTER, M.B. Manc., R.A.M.C.
Major W. N. CHISHOLM, M.B. Edin., R.A.M.C.
Captain R. W. CLARKE, M.R.C.S., R.A.M.C.
Major C. H. DAVIES, M.D. Wales, R.A.M.C.
Major M. H. A. DAVISON, M.D. Durh., R.A.M.C.
Major C. M. ELLIOTT, L.MED. Dubl., R.A.M.C.
Major N. J. ENGLAND, R.C.A.M.C.
Major T. A. GANDER, R.C.A.M.C.
Major D. K. GRANT, R.C.A.M.C.
Captain P. J. HARDIE, M.R.C.S., R.A.M.C.
Major G. W. HEARN, M.D. Lond., R.A.M.C.
Major G. A. HODGSON, B.M. Oxfd, R.A.M.C.
Lieut.-Colonel K. E. A. HUGHES, M.R.C.S., R.A.M.C.
Lieutenant R. J. HUGHES, R.A.M.C.
Captain F. A. JENNINGS, R.C.A.M.C.
Captain NATHAN KAUFMAN, R.C.A.M.C.
Major W. S. KEITH, R.C.A.M.C.
Major A. E. LODEN, M.B. Lond., R.A.M.C.
Major F. J. MCLEAN, R.C.A.M.C.
Captain D. D. MUIR, M.R.C.S., R.A.M.C.
Captain AGNES MURRAY, M.B. Glasg., R.A.M.C.
Major J. B. NEILSON, R.C.A.M.C.
Major W. F. H. O'NEILL, R.C.A.M.C.
Major H. I. PALMER, R.C.A.M.C.
Lieut.-Colonel ROBERT PAUL, M.B. Glasg., R.A.M.C.
Major H. H. I. PEARSON, M.B. Sydney, R.A.M.C.
Major A. F. W. PEART, R.C.A.M.C.
Major H. G. PERCY, M.R.C.S., R.A.M.C.
Lieut.-Colonel R. J. PHILLIPS, M.B. Wales, R.A.M.C.
Major S. F. RAISTRICK, M.R.C.S., R.A.M.C.
Major R. L. REEVES, R.C.A.M.C.
Major W. D. RICHARDSON, M.B. Glasg., R.A.M.C.
Captain H. A. ROBERTS, R.C.A.M.C.
Major G. M. ROSS, M.B. Edin., R.A.M.C.
Major W. H. SCRIVEN, M.R.C.S., R.A.M.C.
Lieutenant J. C. E. SUNDELL, R.A.M.C.
Captain G. C. SWEET, R.C.A.M.C.
Major A. P. D. THOMSON, M.B. Glasg., R.A.M.C.
Major C. I. TUCKETT, M.CHIR. Camb., F.R.C.S., R.A.M.C.
Captain E. C. VANDERVOORT, R.C.A.M.C.
Major R. H. WEBBER, R.A.M.C.
Major C. J. WELLS, M.B. Sheff., R.A.M.C.
Major K. S. WILSON, M.B. Belf., R.A.M.C.
Captain J. C. G. YOUNG, R.C.A.M.C.

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Obituary

RODOLPH CHARLES WINGFIELD

B.M. OXFD, F.R.C.P.

Dr. Wingfield, medical superintendent of the Brompton Hospital Sanatorium, Frimley, for 26 years, died at Camberley on Feb. 5 at the age of 59. Frimley was Wingfield's life work, and the multitude of patients—many of them doctors—who passed through the sanatorium during his time gained courage from his enthusiasm and an abounding faith in the Frimley ritual to get them well.

He was the younger son of Canon Charles Wingfield, who died when Wingfield was a boy, leaving the large family in straitened circumstances. As a result the family moved to Bruges, where the cost of living and of education for the girls was low. Charles was educated at Haileybury, where his successes were athletic rather than scholastic. At Trinity College, Oxford, he was placed class 2 in the final honours school in natural science, played in the university rugby trials, and boxed as a heavy-weight for Oxford. He was unfortunate in having as his opponent at Cambridge the famous John Hopley, probably the best heavy-weight who ever boxed for either university. In 1908 he went to St. Thomas's Hospital, and after taking his Oxford medical degree was house-physician at the hospital, and then demonstrator of morbid anatomy and Louis Jenner scholar, when he came under the influence of L. S. Dudgeon and acquired his lifelong interest in the pathogenesis of pulmonary tuberculosis in man. In 1913 he was appointed physician and medical superintendent of the tuberculosis department which the hospital had set up on behalf of the Lambeth borough council. In this new department Wingfield soon showed his ability as an organiser and clinician; when he left it was considered the best in London. His work was not interrupted by the 1914–18 war, for he was rejected for military service on account of renal calculi. During the war he kept up his interest in pathology by doing many of the autopsies at the Brompton Hospital and so came into direct contact with its work. In 1920 he was appointed medical superintendent of Frimley Sanatorium, where he worked until ill-health compelled him to retire in 1945.

The reputation of Frimley was already high when Wingfield went there, but under his direction it increased steadily. He was an exceptional clinician, and having realised early the value of radiology in the control of treatment he made great use of it at a time when few other similar institutions realised its necessity. As an administrator his gift was of a high order; in spite of a strict discipline, it was the rarest thing for a patient to take his own discharge. He succeeded, too, in keeping the cost per occupied bed low while maintaining a fine standard of treatment and feeding. It was, however, in the handling of his patients and in creating a spirit of hope and comradeship among them that his genius lay; patients seemed to be proud of having been to Frimley. In his view the medical superintendent of a sanatorium should have as complete a knowledge as possible of each patient's background and make-up as well as his clinical condition. His patients were treated as individuals who had developed pulmonary trouble, rather than as cases of tuberculosis of the lungs. No detail was too small for him, no amount of work too great if he could achieve this object. Perhaps he was at his best in his handling of men, though with many of his women patients, especially nurses, he was as successful.

The staff of the sanatorium and his assistants adored him, though he would not tolerate slipshod or careless work. "Lucky indeed were those who started to learn the treatment of tuberculosis under his guidance," writes a former house-physician. "At Frimley he tried to instil his own gift for clear thinking into those who worked with him. Woe betide anyone who made a sweeping general remark unless he was prepared to defend it, for Wingfield might at any moment challenge it. His willingness to discuss problems on terms of equality with his juniors, rather than to lecture to them, made him a fine teacher. When faced with a clinical problem one found oneself asking 'What would Wingfield do?' before 'What shall I do?' Even now, after fifteen years, I am sometimes asked 'What would Wingfield do or say?' and I find myself going through the old mental process." His friends will miss the cheerful, forthright, burly figure, with bowler hat set well on the back of the head. Two aspects of his character which always impressed those who knew him were his absolute sincerity and his devotion to his fellow men. He was no respecter of persons but gave himself unstintingly to all alike. He was a great humanist, and his wide reading, experience, and sympathetic observation of men, combined with his sense of humour, made him a wonderful counsellor. Spiritual honesty, a phrase which he often used, had a real meaning for him, and his faith in his convictions inspired both his patients and his staff.

Wingfield was not a fluent writer, but he had a clear and easy style. From 1920 onwards he produced a steady stream of papers on various aspects of pulmonary tuberculosis and allied subjects; he also wrote three small handbooks intended mainly for students and general practitioners. As a co-author of the decennial reports on the results of treatment at Frimley, he became interested in statistical methods and hence critical of the publication of figures and conclusions which would not bear statistical analysis. As a result he published only a small proportion of his own work and he gave most of the credit to his young collaborators. He was responsible with Dr. Margaret Macpherson for the first mass X-ray survey undertaken in England. The work was done with a portable X-ray plant before the miniature apparatus was available and was carried out on young factory workers. The results were published in 1936 and subsequent work has confirmed his conclusions. He was the moving spirit in starting the Brompton Hospital research department and laid down the lines on which the long investigation into the development of childhood tuberculosis was made. He was the originator of the *Brompton Hospital Reports*, of which he was co-editor until 1945. For many years he was on the council of the National Association for the Prevention of Tuberculosis.

In his scientific work, as in other spheres of his life, Wingfield was essentially an individualist. Team-work did not appeal to him; he disliked serving on committees; and in spite of its proved value he had little respect for work of the survey type. Instead he thought out his own problems in his own way. He would brood long and deeply over a phenomenon that interested him, and after a period of silent gestation would bring forth an explanation that satisfied him. But he was seldom content for long, and was soon at work again, cogitating in his mental armchair on another aspect of the same problem or on some fresh anomaly that had struck him. Like other individualists who neglect the results of their co-workers in the same field, he exposed himself to the risk of narrowness of vision, and some of his conclusions would probably have been sounder had they been based on broader premises. Nevertheless by their very originality many of them proved stimulating and provocative of further work. In these days, when rightly or wrongly scientific bureaucracy is becoming increasingly manifest, men of his stamp are more than ever needed.

The war brought Wingfield more work and worry. A large number of very sick patients and a surgical unit were evacuated to Frimley. The place had been designed for ambulant patients, and although by Wingfield's foresight extra heating and running water had been put into all the rooms just before the war, it was ill-adapted for the purpose. He succeeded in dealing with the situation for as long as was necessary, but the extra strain was a large factor in his early death.

Dr. Wingfield married Isobel Rose Paterson, whom he met as a nurse at St. Thomas's, and she survives him. They had no children.

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Notes and News

HOSPITALS AND RESIDUAL DISABLEMENT

HOSPITALS are asked to notify the local office of the Ministry of Labour whenever a patient is likely to be discharged with residual disablement, excepting children still of school age and patients likely to be retained in hospital or transferred to another hospital or institution. The disablement rehabilitation officer (D.R.O.) of the Ministry will then visit the patient in hospital. Where the patient does not need help in resettlement, no medical report will be required. In other cases the D.R.O. will obtain the patient's written consent to the submission of a medical report, and will complete part 1 of form R.D.1. The hospital will be requested to complete part 2 and to forward the completed form to the local office of the Ministry or (where the patient appears to the D.R.O. to be of Appointments Department standard) to the regional appointments office. After receipt of the completed form, the D.R.O. may need to see the patient again before he leaves hospital, to advise him on training or employment. Hospitals are also asked to notify the Ministry of Labour of outpatients who would benefit by disposal under the Act; and in suitable cases R.D.1 may be submitted to the hospital for completion in respect of these patients. Medical reports should be "as complete and accurate as possible," and "should be capable of ready interpretation by a layman in terms of working capacity."

POSTGRADUATE CHAIR OF OBSTETRICS

OUR New Zealand Correspondent, writing on Jan. 22, says: This week the senate of the University of New Zealand authorised the establishment of a postgraduate chair of obstetrics and gynæcology at Auckland University College. This will be the first postgraduate chair in New Zealand—though it is possible the holder will do some undergraduate teaching as well—and it is a move towards greater self-reliance on the part of the Dominion. It is also a necessary adjunct to the maternity benefits under social security, for without it there would be no means of raising standards of practice in that branch. A committee of Auckland business men have collected £55,000 towards the £100,000 aimed at. An advisory committee will act as liaison between the council of Auckland University College and the faculty of medicine at Otago University in Dunedin.

University of Cambridge

Research grant.—The Rockefeller Foundation has agreed to make a grant of up to £15,000 during the next five years for research in neurophysiology under the direction of Prof. E. D. Adrian, O.M., in the department of physiology.

On Feb. 9 the following degrees were conferred:—

M.D.—A. C. Cunliffe and J. W. Lacey.

M.B., B.Chir.—*F. T. J. Hobday, *M. W. P. Ward, *P. K. Ledger, *J. H. Gough, *J. O. P. Edgecumbe, *J. B. Metcalfe, *P. H. Hewitt, J. E. Blundell, and A. C. Elithorn.

M.B.—*C. M. Heath. * By proxy.

Royal College of Surgeons of England

Lectures on applied physiology and pathology will be given on Mondays, Wednesdays, and Thursdays throughout March (Friday, March 8, in place of Thursday, March 7). Prof. R. A. Willis will lecture on pathology, and Prof. R. J. S. McDowall and Prof. Samson Wright on applied physiology.

British Medical Association

Lieut.-Colonel D. P. Stevenson, an assistant director-general of Army Medical Services, War Office, and Dr. E. E. Claxton, of Sutton Coldfield, Warwickshire, have been appointed assistant secretaries of the association at headquarters. Dr. E. R. C. Walker, of Aberdeen, has been appointed to the Scottish secretaryship.

Postgraduate Training for Demobilised Psychiatrists

The arrangements for postgraduate training for officers whose courses were interrupted by service in the Forces (see *Lancet*, 1945, i, pp. 507 and 773) would not ordinarily be applicable to medical officers of local authorities who have resumed their duties in mental hospitals or mental-deficiency institutions. But many of these will wish to bring themselves abreast of the theory and practice of psychiatry, and the Board of Control are suggesting to local authorities that study-leave should be granted for this purpose. Arrangements have been made in London for the Maudsley Hospital to help these doctors by giving information or advice on available courses. Inquiries should be addressed to: Dr. A. B. Stokes, Maudsley Hospital, Denmark Hill, S.E.5.

University of Sheffield

Dr. C. H. Stuart-Harris has been appointed to the new full-time chair of medicine which has been set up in the university.

Dr. Stuart-Harris graduated M.B. Lond. from St. Bartholomew's Hospital in 1931, winning the gold medal, and when he took his M.D. degree two years later he again obtained this award. After holding house-appointments in the medical unit and children's department at Barts he was awarded a Rockefeller travelling fellowship and later the Foulerton research fellowship of the Royal Society. He has had experience in clinical teaching in the department of medicine of the British Postgraduate Medical School, and in 1944 was elected F.R.C.P. Commissioned in the Supplementary Reserve of Officers before the outbreak of war, he was mobilised in September, 1939, and served in the R.A.M.C. till he was demobilised at the beginning of this year with the rank of colonel. His published work embodies the results of his clinical and laboratory research, both before and during the war, on rheumatic fever, influenza, and typhus.

Prof. Wilson Smith has resigned his chair in the university on his appointment to the chair of bacteriology in the University of London, at University College Hospital medical school. He will take up his new post during the summer.

Thoracic Surgery in Sheffield

Mr. J. T. Chesterman, who is resident surgeon at the City General Hospital, Sheffield, has been recommended for appointment to the new full-time post of thoracic surgeon at the hospital, at a salary of £2000 a year. It is proposed to establish a thoracic unit which shall serve a wide area.

University College Hospital

Mr. R. Benesch, M.SC. Leeds, has been appointed to the British Drug Houses fellowship for the study of the biochemical aspects of cancer, tenable at University College Hospital medical school. He will work in the department of chemical pathology under the direction of Prof. C. Rimington.

M.R.C. Research Units

Addressing the Parliamentary and Scientific Committee in London on Jan. 30, Mr. Herbert Morrison (Lord President of the Council) said that the principal present trend in the development of medical research is the expansion of the system of research units. Each consists of a small group of investigators appointed to the Medical Research Council's scientific staff and working under a director. Each has the task of exploiting a particular field of research and is located in some suitable institution, which may be a hospital, university department, or independent institute. The system is economical in that most of the expenditure is on staff, and it is elastic because there is no permanent commitment in the form of buildings. It also increases the opportunities of collaboration between members of the M.R.C. staff and research-workers in other employ throughout the country.

Society of Medical Officers of Health

The Midland branch held an annual dinner in Birmingham on Feb. 5 under the presidency of Dr. W. S. Walton (M.O.H. for West Bromwich), who recalled that its last social occasion was a luncheon in 1922. The new proposals for a National Health Service would, he felt, have the effect of bringing members of the society back to the essentials of public health, after years of diversion into therapeutic medicine. Prof. J. M. Mackintosh (dean of the London School of Hygiene) remarked that the good M.O.H. had been practising social medicine for generations: such men knew that it is more important to discover what sort of a person has a disease than what sort of disease a person has. Names could be dangerously misleading: "to make a hospital and call it health" was to delude the public; and "there is nothing ignoble about a National Medical Service unless you call it a National Health Service." It was likewise untrue to say that the general practitioner is the first line of resource on all matters relating to health: the general practitioner was concerned with *lack* of health. As for the future rôle of the M.O.H. Dr. Mackintosh maintained that "though much is taken much abides." Dr. R. H. H. Jolly (M.O.H. for Wolverhampton and ex-president of the society) offering, as he put it, a grain of comfort, said that under the new legislation medical officers of health should still be responsible for two very important services—attention to choked drains, and health propaganda. Prof. Johnstone Jervis (M.O.H. for Leeds and president of the society) compared the public-health service to voyagers on a fogbound vessel in unknown waters, but he believed that in due course they would still find plenty of good work to do. Dr. Hugh Paul (M.O.H. for Smethwick and secretary of the branch) proposed the health of The Guests, who included the vice-chancellor of Birmingham University, Prof. L. G. Parsons, and Dr. C. T. Maitland; and the editor of *The Lancet* replied.

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Physician for Aberdeen Students

The University of Aberdeen is to appoint a full-time physician, at a salary of £1200 a year, to take charge of student health services. The holder of the office will also be in medical charge of a number of nurses, and will be expected to investigate the effects on health of the conditions under which students and nurses live and work.

Return to Practice

The Central Medical War Committee announces that the following have resumed civilian practice :—

Mr. J. R. BLACKBURNE, F.R.C.S., 21, Albion Street, Hull.
Dr. J. L. LOVIBOND, F.R.C.P., 81, Harley Street, W.1.
Mr. W. B. R. MONTEITH, F.R.C.S.E., White Cross, Nettleham Road, Lincoln.
Mr. W. F. NICHOLSON, M.B.E., F.R.C.S., 15, St. John Street, Manchester, 3.

American Medical Association

Major-General George F. Lull has been appointed secretary and general manager of the association in succession to Dr. Olin West, who retires next July. General Lull recently retired from the United States Army, in which he was deputy surgeon-general.

The Shortage of Dental Surgeons

At a meeting of the governors of the Dental Hospital of Manchester, reported in the *Manchester Guardian* of Feb. 9, Mr. C. G. Renold, the chairman, said that in 1942 there were about 12,000 dentists in practice and there had been no perceptible increase since. The Services were likely to retain about 1000 and the school dental service would require about 3000, leaving 8000 for the adult population of the United Kingdom; which meant one dentist for every 4500 persons, against America's one to every 1800. During the war the entry of students to the dental schools dropped by 30%, so it seemed the number of effective dentists would probably fall in the near future to 11,000. Something like 25 years must elapse before the number of qualified dentists on the register could be raised to 18,000—a number even then quite inadequate to man a nation-wide dental service as such is at present conceived. An alternative line of approach was to concentrate on the prevention of dental disease. The Dental Hospital of Manchester combined a university department for training and research—the Turner dental school—with opportunities for clinical practice and observation, and arrangements were in train to establish a department of preventive dentistry and research there. Substantial financial support would be needed and the nucleus had been provided by a grant of £30,000 spread over ten years.

Births, Marriages, and Deaths

BIRTHS

JACKSON.—On Feb. 2, the wife of Surgeon Lieutenant G. G. Jackson, R.N.V.R.—a son.
MACKEITH.—On Jan. 30, at Graylingwell, Chichester, the wife of Dr. Stephen MacKeith, O.B.E.—a son.
MATHIAS.—On Feb. 7, at Chobham, Surrey, the wife of Dr. J. Gordon Mathias—a son.
RUTHERFORD.—On Feb. 1, the wife of Mr. R. Rutherford, O.B.E., F.R.C.S.—a daughter.
SMAILES.—On Feb. 1, the wife of Dr. T. W. Smailes, of Honley—a son.
WEST.—On Dec. 18, at Salisbury, the wife of Dr. Peter West—a daughter.
WILSON.—On Feb. 7, in London, the wife of Mr. Roger Wilson, F.R.C.S.—a son.

MARRIAGES

KIRKWOOD—FORSTER.—On Feb. 2, at Peaslake, William Douglas Kirkwood, M.D., of Sloane Street, S.W.1, to Rene Forster.

DEATHS

BERRY.—On Feb. 7, at Harrow, Middlesex, William Leslie Berry, M.B. Camb.
BROWNE.—On Feb. 4, at Queen Anne Street, W.1, Harry Fleming Browne, M.B. Belf.
COHEN.—On Feb. 4, at Guildford, Joseph Cohen, M.R.C.S., aged 79.
COLTART.—On Feb. 7, at Fulham Road, S.W.6, Guy Hemming Coltart, M.B. Lond., aged 71.
GASTER.—On Feb. 4, Sidney Gaster, M.R.C.S., of Evershot, Dorset.
HANBURY.—On Feb. 3, at Lowther Hill, S.E.23, Samuel Barrett Hanbury, L.R.C.P.I., aged 70.
HENDERSON.—On Feb. 5, at Windermere, John Cochrane Henderson, M.B. Glasg.
NEVE.—On Feb. 6, at Srinagar, Kashmir, Ernest Frederic Neve, M.D. Edin., F.R.C.S.
WANSEY BAYLY.—On Feb. 6, at Great Snoring, Norfolk, Hugh Wansey Bayly, M.C., M.A. Camb., M.R.C.S.
WILKINSON.—On Feb. 2, at Virginia Water, William Camac Wilkinson, B.A. Sydney, M.D. Lond., F.R.C.P., aged 88.
WINGFIELD.—On Feb. 5, at Camberley, Rodolph Charles Wingfield, B.A., B.M. Oxfd, F.R.C.P., aged 59.

Medical Diary

FEB. 17 TO 23

Sunday, 17th

SOCIALIST MEDICAL ASSOCIATION
3 P.M. (Midland Hotel, Manchester, Manchester Branch.) Dr. Richard Doll: The State and the Health Service—Efficiency or Bureaucracy?

Monday, 18th

ROYAL COLLEGE OF SURGEONS OF ENGLAND, Lincoln's Inn Fields, W.C.2
5 P.M. Prof. A. J. E. Cave: Anatomy of the Head and Neck. (First of six lectures.)
UNIVERSITY OF MANCHESTER
4 P.M. (Physiology theatre.) Prof. Henry Cohen: The Medical Faculty at the Hebrew University of Jerusalem.

Tuesday, 19th

ROYAL SOCIETY OF MEDICINE, 1, Wimpole Street, W.1
4 P.M. *Pathology.* (Wellcome Laboratories of Tropical Medicine, 183–193, Euston Road, N.W.1.) Demonstrations.
5 P.M. *Medicine.* Surgeon Lieut.-Commander C. Astley Clarke, Surgeon Lieut.-Commander I. B. Sneddon: Nutritional Neuropathy in Repatriated Prisoners of War from the Far East. (Film.) Dr. A. Laporte: Disorders of the Sympathetic Nervous System.
5.30 P.M. General Meeting of Fellows.
MEDICAL SOCIETY OF LONDON, 11, Chandos Street, W.1
5.30 P.M. Mr. F. A. Williamson-Noble: Ophthalmic Emergencies. (Lecture for demobilised medical officers.)
ROYAL INSTITUTION, 21, Albemarle Street, W.1
5.15 P.M. Prof. H. Hartridge, F.R.S.: Recent Advances in the Physiology of Vision. (Last of four lectures.)
CHADWICK PUBLIC LECTURES
2.30 P.M. (26, Portland Place, W.1.) Dr. A. G. G. Thompson: Land Utilisation in Relation to the Public Health.

Wednesday, 20th

ROYAL SOCIETY OF MEDICINE
2 P.M. *Comparative Medicine.* Dr. R. Cruickshank, Mr. R. Lovell, PH.D.: Intestinal Disorders of the Newborn.
BRITISH ASSOCIATION OF PHYSICAL MEDICINE, 11, Chandos Street, W.1
5.30 P.M. Dr. Geoffrey Evans: Physical Methods in the Treatment of so-called Psychosomatic States.
ROYAL EYE HOSPITAL CLINICAL SOCIETY, St. George's Circus, S.E.1
5.30 P.M. Dr. Clifford Hoyle: Hypertensive and Arteriosclerotic Heart Disease.

Thursday, 21st

ROYAL SOCIETY OF MEDICINE
5 P.M. *Dermatology.* (Cases at 4 P.M.)
ROYAL SOCIETY OF TROPICAL MEDICINE AND HYGIENE, 26, Portland Place, W.1
8 P.M. Dr. H. L. Marriott: Medical Experiences of the War in South-East Asia Command.
UNIVERSITY OF EDINBURGH
5 P.M. (University New Buildings.) Prof. H. Davson, D.SC.: Physicochemical Aspects of Vision.
EDINBURGH POSTGRADUATE LECTURES
4.30 P.M. (Royal Infirmary.) Dr. Robert Lees: Penicillin Treatment of Venereal Diseases. (Honyman Gillespie lecture.)

Friday, 22nd

ROYAL SOCIETY OF MEDICINE
3 P.M. *Epidemiology and State Medicine.* Dr. J. R. Hutchinson: Historical Note on Smallpox Prevention.
4.30 P.M. *Disease in Children.* Dr. Beryl Corner, Mr. Arnold Sorsby: Neonatal Infections.
MEDICAL SOCIETY OF LONDON
5.30 P.M. Mr. W. M. Mollison: Otitis Media. (Lecture for demobilised medical officers.)
SOCIETY OF MEDICAL OFFICERS OF HEALTH
2 P.M. (B.M.A. House, Tavistock Square, W.C.1.) Prof. T. Ferguson: Lines of Approach to Public Health.
UNIVERSITY OF EDINBURGH
5 P.M. (University New Buildings.) Prof. Sir Alexander Fleming, F.R.S.: Penicillin—its Origin and Use. (Cameron lecture.)

Appointments

DOOLEY, D., M.R.C.S.: medical superintendent, St. Mary's Hospital, London.
FATHI, J. T., M.S. Lond., F.R.C.S.: temp. hon. surgeon, Connaught Hospital, London.
SAWDON, ELEANOR, M.B. Birm.: asst. M.O.H. for maternity and child welfare dept., Birmingham.
TEARE, DOUGLAS, M.B. Camb.: temp. medical registrar, Hospital for Consumption and Diseases of the Chest, Brompton.
WILKINSON, L. H., M.B. Edin.: temp. electrotherapeutist, Connaught Hospital, London.
The following factory surgeons have been appointed:
FORBES-SEMPILL, ELIZABETH, M.B. Aberd.: Alford, Aberdeenshire.
STEWART, J., L.R.C.P.E.: Brackley, Northants.
SCOTT, J. A., M.B. Edin.: Uphall, West Lothian.
ARMSTRONG, G. R. A., M.B. Edin.: Stourport, Worcestershire.

Dr. WILLIAM BEAUMONT will give an address, entitled A Post-war Survey, to the Society of Physiotherapists at 3.15 P.M. on Saturday, Feb. 23, at 28, Portland Place, W.1, following the annual general meeting.

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ACUTE INFECTIONS OF PLEURA
TREATED WITH AND WITHOUT PENICILLIN

L. FATTI
F.R.C.S.
THORACIC SURGEON, HILLINGDON COUNTY HOSPITAL, UXBRIDGE

M. E. FLOREY *
M.B. Adelaide
RESEARCH CLINICAL ASSISTANT

H. JOULES
M.D. Lond., F.R.C.P.
MEDICAL DIRECTOR

J. H. HUMPHREY
M.B. Camb.
ASSISTANT PATHOLOGIST

J. SAKULA
M.D. Lond., M.R.C.P., D.C.H.
PÆDIATRICIAN

CENTRAL MIDDLESEX COUNTY HOSPITAL

THE following study was carried out to find a satisfactory technique for using penicillin in the treatment of acute infected effusions of the pleural cavity and to provide a further demonstration of the clinical effects of the rapid elimination of infection with gram-positive organisms.

To provide a yardstick against which to measure the effects of different techniques employed with penicillin, controls receiving no penicillin but treated on well-recognised lines were also observed. In the two series temperature, pulse-rates, respiration-rates, pus formation, blood changes, restoration of health, radiological appearances, healing time, and functional result have been compared. Two main objects have been kept constantly in mind—the control of infection and the functional result. Healing of the sinus, however, so long as it is permanent, provides the most clear-cut end-point for comparison, so assessment of successful treatment is based on this.

CONDITIONS PREVAILING DURING THE INVESTIGATION

Choice of Cases.—The survey covers 38 cases: 27 in the early toxæmic phase and 11 already well-localised empyemata. They were all the patients with acute infected pleural effusions admitted to the two hospitals between Oct. 22, 1943, and April 12, 1944. The 27 early toxæmic cases being considered most worthy of study, controls, with one exception, were taken only from them, so that full care and a fair representation of progress and treatment over almost the whole course of their illness could be secured. They were taken in strictly alternate chronological order with the "treated" toxæmic cases, no other selection being made either on clinical or bacteriological grounds. The exception, case 1, was included so that representation of results in the control series of every technique used in the "treated" might be fair. He was the only case who offered a good chance of recovery from aspiration and sulphonamide administration alone, and he did in fact recover.

Patients who had lost their acute toxæmic symptoms and already reached a frankly purulent stage—on whom, therefore, a complete study could not be made—were all treated with penicillin, thus providing an opportunity of finding whether the same techniques were suitable at all stages of a pleural infection. Since this comparative study, a further 8 cases have been treated with penicillin along the same lines as were finally found most satisfactory. Though their follow-up cannot be so complete, they indicate that the techniques and results described here were equally applicable to them.

Conditions at beginning of treatment are shown in table I. Both series possessed a representative group of infecting flora; though, regrettably, there was only one case with a putrid empyema, and that fell in the control series. This man's progress towards recovery, however, was steady and so closely approximated to the mean times recorded for the whole series that it did not alter the statistical analysis.

The duration of symptoms before treatment in the toxæmic cases of both series varied from five to twenty-one days, but in the simple empyemata symptoms had lasted from twenty-one to thirty-three days.

Table I shows that the associated pathological conditions and the age variations were liable to load the results against the "treated" cases, whereas the sulphonamide administration and duration of symptoms should have made no difference.

Conditions prevailing during treatment and follow-up, apart from the specific treatments, were as far as possible the same in both series. Controls and "treated" patients were nursed in the same wards by the same nursing staffs and attended by the same physicians or surgeons, every care being taken that they should each receive an equal amount of attention.

Sulphonamides were given to all cases for their pneumonia after admission to hospital. The dosage consisted in a minimum, for adults, of 20 g. over a period of three to four days, the drugs used being, in order of frequency, sulphamezathine, sulphapyridine, and sulphathiazole. Children received doses based on their age.

Both series were observed throughout their stay in hospital and thereafter at fortnightly and monthly intervals—so far as the bombing of London would allow—till at least six months had elapsed since the onset of pneumonic symptoms. The evacuation made the regular follow-up of the children particularly difficult, but a final survey, sixteen months after the last case was treated, has given some assurance that the recoveries recorded are permanent.

TABLE I—CONDITIONS AT BEGINNING OF TREATMENT

	No. of cases	
	Controls	Treated
Clinical condition		
Effusions with toxæmia	13	14
Localised empyemata	1	10
Total	14	24
Infecting organisms		
Pneumococcus	7 (1 empyema)	15* (9 empyemata)
Staph. aureus	2	5 (1 empyema)
Streptococcus:	4	4
Hæmolytic	3	3
Non-hæmolytic (alone)	1	
Anaerobic	0	1
Unknown origin†	1	0
Total	14	24
Age-incidence		
Under 5 years	1	5
6–13 years	6	4
16–53 years	7	11
60–74 years	0	4
Total	14	24
Known associated "pathological" conditions		
Deformity of chest	1	3
Chronic "bronchitis"	1	4
Antecedent upper respiratory-tract infections	4	2
Acute "bronchitis"	2	1
Pleural effusions on opposite side	0	1 (Same case)
Pericarditis:		
Dry	0	1 (Same case)
Fibrinous	0	1 (Same case)
Multiple lung abscesses	0	1 (Same case)
Auricular fibrillation	0	2
Tuberculous cavity	0	1
Multiple empyemata	0	2
Bronchiectasis	1	0
Diabetes	0	1

* One in combination with non-hæmolytic streptococcus.
† Gram-positive and gram-negative cocci and bacilli in film; culture sterile.

Treatment of controls after the detection of infected fluid consisted in further administration of a sulphonamide (12 cases), aspiration whenever the effusion

* With a grant from the Medical Research Council.

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could be located, and drainage as soon as it had become frankly purulent. Rib-resection was carried out in 11 cases, though a preliminary intercostal drain was tried in 6 of them; 2 patients recovered on intercostal drainage only and 1 on aspiration. After drainage most cavities were washed out daily with eusol, till they became a small sinus a few inches long. Drainage tubing inside the cavity was gradually shortened and reduced in diameter till 'Lipiodol' radiograms demonstrated that no cavity remained. Dry dressings were then applied twice a week until the wound had healed. All patients were instructed in breathing exercises so soon as their toxæmic signs had subsided, and these were continued till their chests were expanding well, or till they were evacuated.

Treatment of Penicillin Cases.—The techniques used with penicillin will be described in full in another paper (Fatti et al. 1946). Those found satisfactory were briefly as follows:

For small interlobar effusions—repeated aspiration and injection of penicillin.

For non-purulent effusions—aspirations and injections of penicillin till frank pus formed, followed immediately by intercostal drainage alternating with instillation.

For purulent empyemata—intercostal drainage alternating with instillation.

The choice of dose has been explained previously (Florey and Heatley 1945). A systemic dose was given during the toxæmic phase—240,000 units every two days while aspirations were carried out, 60,000 units twice daily when intercostal drainage was set up. Once the empyema was well localised, a dose for local effect only—5000 units twice daily—was sufficient to sterilise the cavity.

The comparative study is based exclusively on cases treated on these lines. Rib-resection and the treatment of large effusions by repeated aspiration and injection were each found to produce poor results on all cases so treated. These techniques, therefore, are not recommended; nor are their results included in the comparison.

TABLE II—HEALING TIME OF ACUTE INFECTED PLEURAL EFFUSIONS

—	Total duration of illness			Duration from drainage to full healing		
	No. of cases	Weeks		No. of cases	Weeks	
		Mean†	SE of mean		Mean†	SE of mean
Controls ..	13*	15·0	±1·37	12‡	11·6	±1·67
Treated ..	20	7·0	±0·30	17‡	3·6	±0·31
Difference ..	..	8·0	±1·40	..	8·0	±1·70

* Case not healed at 63 weeks, excluded because of drainage tube retained for several months.
† Standard deviation—"Controls" = 4·94 and 5·77 respectively.
" " —"Treated" = 1·34 and 1·28 "
‡ Numbers exclude cases treated by aspiration only.
SE = standard error.

COMPARISON OF RESULTS IN CONTROLS AND "TREATED" SERIES

Healing Time.—It was thought advisable to compute the total duration of illness from the earliest pneumonic symptoms rather than from the somewhat arbitrary moment when successful exploration was first carried out. The end-point was taken to be the date at which full healing had taken place. A computation could then be made of the time by which the duration of illness had been shortened as a result of penicillin treatment. The techniques evolved have not only shortened the mean recovery time by eight weeks, measured either from earliest pneumonic symptoms or from drainage, but also made the process of recovery steadier and less variable (table II).

Bacteriological Comparisons.—Samples of pleural fluid were examined after each aspiration and thereafter in most cases at half-weekly, weekly, fortnightly, and longer intervals till healing had taken place. Films were made and stained by Gram's method. Aerobic cultures were made on blood-agar plates, care being taken to spread the pus widely to prevent penicillin from being carried over and inhibiting growth. Penicillinase was used during the latter part of the investigation but did not increase the number of positive cultures. Anaerobic cultures were made when organisms seen in early films did not grow aerobically, as well as on all foul-smelling fluids, and they were continued as a routine in cases from which anaerobes had already been isolated.

Sensitivity.—The organisms in the first sample were examined by the ditch-plate method for sensitivity to penicillin in 26 cases and to various sulphonamides in 18. Sensitivity to penicillin is expressed in relation to the Oxford *Staphylococcus aureus*. No organism was found insensitive to penicillin, though a considerable proportion were insensitive (or only slightly sensitive) to the sulphonamides. It has to be remembered in this connexion that all patients had already had courses of one or two sulphonamides for their pneumonia.

Cases with infecting organism sensitive to:

	one or more sulphonamides	*penicillin*
Controls	5 out of 9	9 out of 9
Treated	4 " 9	17 " 17

Disappearance of the original infecting organism was watched for in both film and culture. In controls it was found that pneumococci disappeared from cultures in every case where they were the infecting organism, but the time taken for disappearance was three to six weeks from first aspiration. Streptococci also disappeared in 2 out of 3 instances, but staphylococcal infections persisted until healing had taken place. Cultures in "treated" pneumococcal and streptococcal infections were almost invariably sterile at the first examination after penicillin treatment had begun, the time interval being anything from six hours to five days. Staphylococcal cultures remained positive longer, none being sterile in less than five days.

There was a well-marked difference, however, between the times taken for organisms to disappear from cultures and from films. In controls disappearance from films was rare and haphazard, but in the "treated" cases disappearance from films was consistent and in no instance preceded that from culture, the usual times being five to twelve days for films and one to five days for cultures. Sterile cultures in pneumococcal and streptococcal cases did not coincide with the cessation of pus formation and were not necessarily an indication that the infection had been overcome, though it was more often so in staphylococcal cases. Steady diminution in numbers, phagocytosis of the cocci, fragmentation, and complete disappearance of cocci from films were an excellent guide to the effectiveness of not only chemotherapy but also drainage. Non-disappearance of organisms from films before treatment was discontinued was observed in 2 cases, in both of which drainage was obviously not fully effective.

Cases from which the primary invader disappeared:

	from film	*from culture*
Controls ..	6 out of 14	8 out of 14 (107 examinations)
Treated ..	22 " 23*	23* " 23 (215 ")

* Patient who died on 8th day of treatment excluded.

Reappearance could be studied only in "treated" effusions. It was observed in films in large effusions which were treated by aspiration and injection (a technique which was eventually discarded), but permanent disappearance followed drainage and further treatment.

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The probable explanation was that the first disappearance was not a true one, only the upper layers of the effusion having been aspirated.

Superadded infection was almost universal in the controls, the only case escaping being one in which the effusion was removed by aspiration only. Gram-positive infection predominated, but there were a few instances of associated gram-negative invaders. In the "treated" series, it was not so prevalent as in the controls, but only 8 of the 24 escaped it altogether. No fresh gram-positive infection took place during treatment, but *Staph. aureus* appeared in 4 wounds after treatment had been discontinued. In all of these cases, whether subsequently treated with penicillin or not, healing was prolonged beyond the mean for "treated" cases. *Bact. coli* was the commonest gram-negative invader, but *Pseudomonas pyocyanea* and *Proteus* appeared in several instances. It was difficult to associate their presence with any serious clinical phenomenon, but they had the distinct disadvantage on several occasions of being associated with the formation of a small amount of pus in the sinus after the primary invaders had entirely disappeared. Thus the very useful clinical criterion for removing the drainage tube—that of the discharge ceasing to be purulent—was lost.

Cases in which secondary invaders appeared:

—	Total	*Staph. aur.*	*Strep. haem.*	*Bact. coli*	*Ps. pyocyanea*	*Proteus*
Controls ..	13 out of 14	10	4	2	2	1
Treated ..	15 ,, 23	4*	0	12	5	2

* All after penicillin was discontinued.

The absence of all gram-positive pyogens in routine examinations after treatment has begun gives the best indication of the elimination of infection. A larger number of examinations per case were made in the treated series, but the difference is made thereby all the more certain.

Examinations showing complete absence of gram-positive pyogens:

	from film	*from culture*
Controls ..	12 out of 70	3 out of 76
Treated ..	92 ,, 152	135 ,, 181

Pus Formation.—The formation of frank pus exhibited well-marked differences in the two series. Once formed in controls, it continued throughout till healing was almost complete. In the "treated," pus formed more rapidly and then thickened so much that aspiration was extremely difficult. Eventually it became almost gelatinous but then began to get thin again and within a few days was serous or sero-sanguineous, though fibrin flakes continued to be expelled from pneumococcal effusions for several weeks if drainage was continued. The appearance of a serous exudate followed the disappearance of organisms from films much more closely than it did the sterility of cultures (table III). These two findings, clinical and bacteriological, were the indication for discontinuance of drainage and treatment.

TABLE III—TIME RELATION BETWEEN DISAPPEARANCE OF GRAM-POSITIVE COCCI IN CULTURES AND FILMS AND CESSATION OF PUS FORMATION IN "TREATED" CASES. (FIGURES ARE DAYS FROM FIRST TREATMENT.)

Case number:	1	15	8	13	4	16	5	6	10	20
Culture sterile by	6*	1	2	4	15*	1	4	6	5*	5*
Films negative ,,	10	7	14	32	15	12	12	13	9	5
Pus ceased ,,	10	7	19	40	21	13	18	15	7	8

* Staphylococcal infections.

TABLE IV—COMPARISON OF TIMES TAKEN FOR TEMPERATURE, PULSE-RATE, AND RESPIRATION-RATE TO MAINTAIN NORMAL LEVELS

—	Temperature			Pulse-rate‡			Respiration-rate‡		
	No. of cases*	Weeks		No. of cases†	Weeks		No. of cases§	Weeks	
		Mean	SE of mean		Mean	SE of mean		Mean	SE of mean
Controls ..	13	>9	±0·66	13	>9·2	±0·77	12	6·3	±0·51
Treated ..	18	6	±0·31	12	5·8	±0·42	16	4·5	±0·34
Difference	..	3	±0·73	..	3·4	±0·88	..	1·8	±0·61

* Cases with intercurrent infection excluded from both series.
† Patients under 6 and over 60 years of age excluded.
‡ Normal standards for pulse-rates:
80–90 per min. for patients aged over 12 years.
90–110 ,, ,, ,, ,, under 8 ,,
,, ,, for respiration-rates:
20–22 per min. for patients aged over 12 years.
20–24 ,, ,, ,, ,, under 8 ,,
§ Cases with normal respiratory rates before 1st aspiration, or with intercurrent infections, excluded from both series.

Temperature, Pulse- and Respiration-rates.—Repeated aspirations and injections of penicillin undoubtedly lowered temperature, pulse-rate, and respiration-rate to a greater degree than did aspirations and sulphonamide administration, but the drop was gradual and only temporary if the effusion became purulent and could not be completely aspirated. Though when pus formed it was sterile on culture, its production synchronised with the return of a high swinging temperature (see figure).

As evidence of the elimination of toxæmia the time taken to attain consistently normal levels was compared in the two series (the standards of normality for pulse-rate and respiration-rate are set out at the foot of table IV). Even though the figures are incomplete because 6 controls left hospital between the 10th and 15th weeks before normal standards had been reached, there was a significant reduction in the period of toxæmia as judged by these manifestations. It must be emphasised that, though respiration-rates in "treated" cases came down quickly in the early stages of treatment, there was not a dramatic difference between the temperature and pulse curves in the two series at this time. Peaks of 99°–100° F would continue to harass the physician during the period of drainage and instillation although the patient was in reality making steady progress towards recovery.

TABLE V—COMPARISON OF WHITE-CELL COUNTS IN TOXÆMIC CASES

Period of examination	Series	No. of examinations	Cells per c.mm. of blood		
			20,000 to 40,000	10,000 to 20,000	10,000 or less
Before aspiration	Controls	9	7	0	2
	Treated	13	7	4	2
During aspiration and treatment	Controls	13	5	8	0
	Treated	8	1*	5	2
During drainage and treatment	Controls	26	8	7	11
	Treated	30	0	14	16

* One of the two cases with less than 10,000 before treatment began.

Blood Changes.—Serial examinations were made on nearly all toxæmic cases. Though every case was not examined at weekly intervals, there appeared to be a sufficiently representative number of recordings in each week of illness to allow of the following assumptions:

In both series white cells (table v) were usually high before aspiration was begun, though the most seriously ill children registered counts of only 6000–9000. In contrast to the controls, whose counts following aspirations and even during the early weeks of drainage were very variable, those of the "treated" showed a steady fall to 10,000 or less by the 4th–5th week from onset of symptoms—i.e., within one to three weeks from beginning of treatment. No rise took place even

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when pus formed during the period of aspiration and instillation; the 2 exceptions were in those children with a relative leucopenia at the height of their infection who showed an immediate rise once treatment was begun.

Red cells (table VI) showed little diminution in either series, and only 6 of all cases examined reached levels at any time below 4,000,000. There was a tendency to drop to lowest levels in the 4th week, followed by a rise to normal between the 6th and 9th week.

TABLE VI—COMPARISON OF RED-CELL COUNTS AND HÆMOGLOBIN PERCENTAGES

Time from onset of symptoms	Controls			Treated		
	No. of observations	Red cells (millions perc.mm.) mean	Hb % mean	No. of observations	Red cells (millions perc.mm.) mean	Hb % mean
2nd week ..	2	4·9	77	2*	5·2	70
3rd week ..	5	4·6	72	8*	4·2	71
4th week ..	6	4·0	70	7	4·1	71
5th–7th week	8	4·6	77	10	4·8	77
8th–9th week	7	5·2	76	6	5·1	83

* Readings before or within a few days of beginning treatment.

The hæmoglobin percentage fell off more rapidly, and even by the 9th week most cases tested had values well below normal, though subsequent readings after six months revealed the power of a number of patients to reach 100% or over. These changes were seen in both series, and there was little difference between the two. This is in contrast to cases of osteomyelitis and septicæmic conditions, where the steady rise from low red-cell counts is a guide to progress during penicillin treatment.

Erythrocyte-sedimentation rates, taken at weekly intervals, are reported in 5 cases of each series where no intercurrent infection confused the readings. As with temperature and pulse-rate, there was no rapid fall coincident with the rapid elimination of infection to distinguish the "treated" from the controls. The fall was steady, however, from the onset of treatment, as compared with considerable variability in the controls. The following times were taken to reach 10 mm. per hour (Westergren) after the first aspiration of infected fluid and treatment:

Controls—7, 9, 10, 12, and 20 weeks.
Treated—4, 4, 6, 7, and 7 weeks.

Radiological Findings.—The 38 patients were radiographed on over 350 separate occasions, and at least half were also examined by serial screening. Controls were followed for a minimum of six months; "treated," in every instance but one, till the chest had completely cleared. An opportunity was thus provided for comparing the rate at which the pleural shadows disappeared.

The difficulties of radiographing every patient at exactly the same intervals from the onset of the symptoms were too great to be completely overcome. Nevertheless the intervals were sufficiently close to give a fair idea as to whether the use of penicillin delayed resolution, as has been noted by some investigators using only aspiration and injection (Butler et al. 1944, Roberts et al. 1945). Among the properly treated toxæmic cases the evidence pointed to there being acceleration irrespective of the infecting organism.

The latest date after the onset of symptoms on which each chest was reported "not clear" and the earliest date on which it was reported "clear" are known, though the state of the chest in the intervening interval is not. But, assuming that once a radiogram of the affected side is clear it remains so, it is possible to determine for each week the number of patients in each series about whom the state of the chest is known and the proportion of those reported clear. In this way the time at which 50% of each series became clear can be determined. It was found that the 50% point for the controls was 22·3 weeks (13 cases), and for the "treated" 11·6 weeks (12 cases). In other words, the average time for clearance in the "treated" was only half that of the controls.

When treatment was not begun till the toxæmic stage had passed, considerable variation in clearing was noted, but this seemed to depend on the effectiveness of the drainage: when it was adequate (4 cases) clearance took place within twelve weeks; when it was inadequate 2 chests took as long as thirty-six and fifty-two weeks to clear completely.

In the "treated" series there was a definite difference in the rate of clearance according to the type of infecting bacteria. Staphylococcal infections cleared remarkably quickly, in seven to ten weeks (4 cases), whereas pneumococcal and streptococcal required twelve weeks or more.

It can fairly be stated, therefore, that radiograms of patients treated with penicillin and effective aspiration or drainage can be expected to show complete resolution within three months from the onset of pneumonic symptoms. Radiological evidence in "treated" cases, however, could be used only as a guide to the discontinuance of drainage in so far as it demonstrated that no fluid level existed. This was because of the much earlier stage of resolution at which it was justifiable to remove the drain.

Chest expansion and deformity were observed and measured throughout the acute and convalescent stages. Though a considerable falling-in of the chest walls was often noted in the "treated" and controls immediately after drainage was set up, the results at the end of six months show what good functional results can be obtained when infection is quickly eliminated (table VII). The controls had as much or more physiotherapy because of their longer stay in hospital, yet this did not overcome completely the contraction which inevitably follows the laying down of much infected granulation tissue (Florey and Williams 1944).

TABLE VII—FINAL COMPARISONS AT 24 WEEKS

—	Control cases	Cases treated
Total..	13*	21*
General condition		
Not so good as before illness ..	4 out of 13	0 out of 21
Below normal weight	3 ,, 13	0 ,, 21
Not back at work or school ..	5 ,, 12†	1 ,, 17†
Local conditions		
Wound not firmly healed ..	4 ,, 13	0 ,, 21
Cough	6 ,, 13	4 ,, 21
Yellow sputum	4 ,, 12‡	0 ,, 21
Radiograms not clear	5 ,, 10§	4 ,, 17§
Chest expansion not equal to normal side	5 ,, 11‖	1 ,, 16‖
Deformity¶	5 ,, 11‖	0 ,, 16‖
Residual lesions		
Chronic sinus	0 ,, 13	0 ,, 21
Bronchiectasis	2 ,, 13	0 ,, 21
Cerebral abscess	0 ,, 13	0 ,, 21

* Cases excluded:
"Controls"—1 because of error in treatment—drainage tube left in for several months.
"Treated"—1 who could not be traced after 12 weeks; 1 whose condition was complicated by pericarditis, &c.; 1 whose treatment was discontinued after rib-resection.

† Cases under school age not included.

‡ One infant excluded who did not spit.

§ Remaining cases did not report near enough to 24 weeks to be included.

‖ Cases excluded with pre-existing deformity.

¶ Deformity = flattening of chest walls, deeper infra- and supraclavicular fossæ and drooping of shoulder as compared with normal side.

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Final Comparative Assessment.—This was made six months from the onset of symptoms and is summed up in table VII. The careful attention given to the controls appears to have been rewarded by few serious residual complications (cf. Burford and Blades 1942), especially if it is remembered that bronchiectasis might have been present in both cited cases before their empyemata developed. Even so, the long period during which the "treated" had needed no hospital attention, their good general condition, the absence of any evidence of residual infection (yellow sputum, sinuses, or bronchiectasis), and the high proportion whose chests were expanding normally and who were fit to return to their former work, demonstrated the more certain return to normality when infection is rapidly and effectively eliminated.

DISCUSSION

Among an already extensive literature on the clinical application of penicillin little comparative work has yet been published. Yet the advance on present methods of treatment and the results to be expected from rapid elimination of infection cannot be assessed without some type of control. A known high death-rate, such as that of cavernous-sinus thrombosis or of subacute bacterial endocarditis, or the chronicity of a complaint, such as that of marginal blepharitis or of sulphonamide-resistant gonorrhœa, can be used as standards against which to assess the recovery-rate with a specific treatment. But in acute conditions, from which some kind of recovery is the normal expectation, a parallel series of cases is needed against which to measure the effects of a new therapeutic agent. Before the comparison can be satisfactory, however, a suitable dosage and technique must be worked out.

d'Abreu et al. (1944), having first found a suitable technique to use with penicillin treatment of intrapleural infections in battle casualties, contrasted the results of 12 cases so treated with those of 40 previous cases. They found that the case-mortality was reduced from 12·5% to nil and the percentage healed in two months raised from 5 to 100.

Brown (1944) contrasted the standard of healing in 71 wounds selected for suture after one insufflation of sulphanilamide with a later equivalent series of 110 sutured after one insufflation of penicillin-sulphathiazole powder. The proportions healing "satisfactorily" were 61·9% with sulphanilamide against 92·9% with penicillin-sulphathiazole.

Furlong and Clark (1944), tackling a more difficult problem, contrasted results in two consecutive series of 70 open fractures of the femur, one treated with sulphanilamide and the other with penicillin. They found the death-rate reduced from 8·5 to 1·4% and the amputation-rate reduced from 8·5 to 2·8%, but in those that survived there was no significant difference between the percentage of cases healed three months after wounding and of those with loculated pus in their wounds. The results may well have been so disappointing because a suitable method of combining penicillin administration and surgical technique had not then been found.

Bentley and Scott Thomson (1945) studied the effects of surgery, sulphanilamide, and penicillin on prophylaxis of wound infection. They compared the incidence of sepsis—clinical and bacteriological—among 1000 wounds six to nine days after wounding. This was the first examination after treatment at the casualty clearing station. They found the incidence among those treated by surgery alone to be 23%, by surgery and sulphanilamide powder 11%, and by surgery and penicillin-sulphathiazole powder 7%. Though the addition of the antibacterial agents produced a significant lowering of the incidence of sepsis compared with surgery alone, the difference between the results with the two agents is not large enough to be significant. Penicillin must be applied repeatedly to produce the best results.

Cutler and others (1944) also compared the incidence of clinical infection in 250 wounds sustained in aerial combat and treated either by surgical methods alone or in combination with local and two to three days' course of systemic penicillin. No difference was noted in the two series. It is unfortunate that there is no description of how the cases were chosen for the controls and "treated" series, how long local treatment was continued, or at what stage after wounding the assessment of infection was made.

White and others (1944) made a carefully controlled study of the prophylactic effect of penicillin given intramuscularly before and after single or multiple lobectomies, using as controls similar contemporaneous cases without any chemotherapy. The effect of the penicillin on the incidence of empyema after these operations for bronchiectasis is striking. All 9 controls developed empyema, from which there were 3 deaths, whereas in the "treated" series of 12 cases there were no empyemata. The beneficial effects after operation for tuberculous conditions were much less definite.

Appelbaum and Nelson (1945) describe a series of 67 consecutive cases of pneumococcal meningitis. After sulphonamide therapy they were treated with intrathecal and intramuscular penicillin, the recovery-rate being 39%. In a previous series of 139 cases, treated with sulphonamides and antipneumococcal serum, the recovery-rate was 35%. It would be interesting to

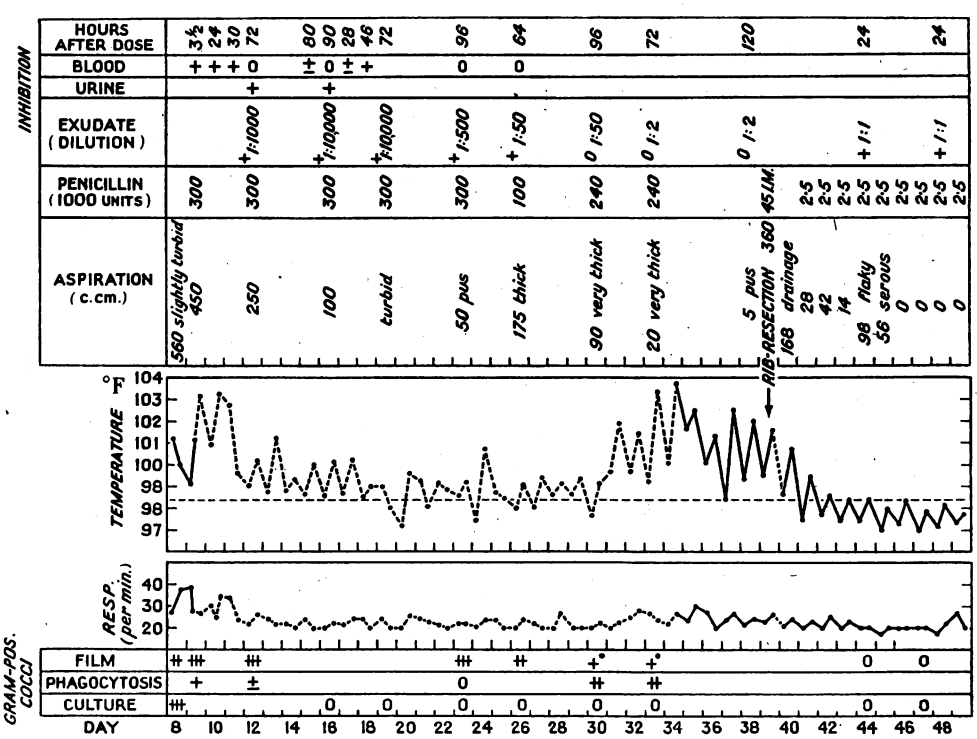

Chart of a case of empyema due to a penicillin-sensitive hæmolytic streptococcus showing (1) reduction in temperature and respiration-rate during aspiration of thin fluid and subsequent rise in temperature as effusion becomes purulent though sterile; (2) persistence of gram-positive cocci in films after disappearance from cultures; (3) presence of bacterial inhibition in the blood-stream up to 46 hours after one intrapleural injection of penicillin; and (4) steady diminution of demonstrable bacterial inhibition in the pleural exudate as it thickens. The interrupted lines represent the period of systemic administration of penicillin.
*** Cocci fragmenting.**

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know if a further series, treated with penicillin from the onset and with antiserum, would show better results.

Robinson (1945), comparing the results of two consecutive series of 34 and 43 hæmolytic streptococcal throat infections in a British garrison in the winter 1944–45, found that the use of penicillin pastilles in the second series halved the average recovery time as compared with sulphathiazole treatment by spray or by ingestion. (This improvement was not evident when a penicillin spray was used.) The incidence of acute rheumatic fever was reduced from 6 in 34 to 0, though it must be remembered that the penicillin-treated infections occurred in the second half of the winter, when the epidemic was presumably dying down.

Anderson and Ferguson (1945) compared the results of two contemporaneous series, each of 63 cases of pneumonia, one treated with sulphathiazole and the other with penicillin. They showed that a treatment with penicillin lasting less than half the time of that with sulphathiazole produced no obvious improvement in clinical response in uncomplicated cases, but that recovery in gravely ill cases, and the lower incidence of infected effusions, of delayed resolution, and of toxic effects favoured the penicillin series. The causes of death were too varied to make a comparison feasible in numbers of this size.

A comparison of results in two contemporaneous series, each of 100 acute infections of the hands, was made by Florey and Williams (1944). Both series were given the usual surgical treatment, but the "treated" series also had penicillin applied locally. The results demonstrated the rapid elimination of bacterial infection and cessation of pus formation, the complete arrest of destructive processes (sloughing and sequestra formation), the reduction of mean time from first surgical interference to full healing to ⅔ to ½ that of controls, and the more rapid and complete return of function.

The present paper demonstrates consistently similar results in a very different type of lesion. It is noteworthy that, in spite of very much larger infected surfaces to deal with, the combination of penicillin treatment with an adapted surgical technique has still further reduced the time from first surgical interference to full healing to less than a third of that in the controls. In these cases there was no open wound depending on the rate of epithelial growth for its healing to be completed.

The serious condition of the toxæmic patients gave us an opportunity to assess the effect on the more generalised signs of infection. No dramatic changes were noted in the usually accepted clinical criteria of an infective process. The subsidence of temperature, pulse-rate, respiration-rate, and erythrocyte-sedimentation rate seemed to be more nearly related to the resolution of inflammation than to the unprecedented rapidity with which this drug eliminated infection as witnessed by the time taken for the disappearance of bacteria and pus.

It is worthy of note that in the early stages of treatment, pus, though sterile, was associated with a swinging pyrexia. This fact should be remembered by the clinician using penicillin systematically, for its good effects may not be recognised unless a constant watch is kept for loculated pus and this is evacuated so soon as it is found.

Some comment on the use of the term "controls" seems advisable. In the strictly scientific meaning they are almost impossible to secure in clinical work, for conditions can rarely be exactly the same in the two series except for the one factor being tested. Every care was taken, however, to make the conditions surrounding the two series described here as similar as possible apart from their specific treatment. Epidemiological influences were counteracted by making the comparison between infections occurring in the same seasons and in the same localities, and personal bias was eliminated by choosing toxæmic cases for each series in strictly alternate chronological order. It is a fair assumption that the cases described as controls were sufficiently representative to form a standard against which to measure the new type of treatment. Though numbers are small, the tables show that the differences are so great as to be statistically significant; hence there can be no doubt that every advantage is to be gained, irrespective of age and attendant disabilities, in reduction of toxæmia and healing time, improvement of functional result, and lack of final complications, by the early use of penicillin combined with closed drainage.

SUMMARY

A comparison has been made of the progress and end-results between two contemporaneous series of acutely infected pleural effusions: 14 cases treated by standard methods (Controls) and 20 cases treated with penicillin and an adapted surgical technique ("Treated").

The results show that in "treated" cases (1) toxæmic manifestations disappeared at a significantly greater rate; (2) pus formation was speeded up rather than prevented; (3) retained pus, even if sterile, produced a recurrence of pyrexia; and (4) leucocytosis steadily disappeared as the infection was controlled, but the immediate effect of treatment on leucopenia was to increase the number of white cells.

Red-cell examinations were not a guide to progress during treatment as they are in infections producing severe anæmia.

Mean healing time—from first pneumonic symptoms to full healing—has been reduced from 15·0 to 7·0 weeks, and from drainage to full healing from 11·6 to 3·6 weeks.

Radiological evidence pointed to the more rapid clearing of abnormal shadows, usually within three months.

Chest expansion more often returned to normal by the end of six months in the "treated" cases.

Evidence that the rapid healing was permanent was that there had been no recurrence or residual signs of infection, radiological or clinical, in the affected side by the time the investigation was completed sixteen months after the last case was treated.

The patients treated with penicillin were fit to resume their former work considerably sooner than those treated by other methods.

The techniques used will be described in detail in another paper.

We wish to thank Dr. J. S. Bray and the laboratory staffs of both hospitals for the innumerable hæmatological and bacteriological examinations carried out for us, and especially Mr. F. B. Trenholm for noticing the stage of fragmentation preceding the complete disappearance of gram-positive cocci. The nursing staffs assisted in the work with the enthusiasm that one has been led to expect from them, and the radiological departments submitted without complaint to the continual stream of requests for their services. Mr. P. H. Leslie gave advice on the statistical data, and Dr. M. A. Jennings on the text. Mr. H. Axtell was responsible for drawing the chart and for the photography.

REFERENCES

Anderson, T., Ferguson, M. S. (1945) *Lancet*, ii, 805.
Appelbaum, E., Nelson, J. (1945) *J. Amer. med. Ass.* 128, 778.
Bentley, F. H., Thomson, S. (1945) *Brit. med. J.* i, 471.
Brown, J. J. M. (1944) *Brit. J. Surg.* 32, 140.
Burford, T. H., Blades, B. (1942) *J. Amer. med. Ass.* 118, 950.
Butler, E. C. B., Perry, K. M. A., Valentine, F. C. O. (1944) *Brit. med. J.* ii, 171.
Cutler, E. C., Morton, P. C., Sandusky, W. R. (1944) *Brit. J. Surg.* 32, 207.
d'Abreu, A. L., Litchfield, J. W., Thomson, S. (1944) *Ibid*, 32, 179.
Fatti, L., Florey, M. E., Joules, H., Humphrey, J. H., Sakula, J. (1946) *Lancet*, in press.
Florey, M. E., Heatley, N. G. (1945) *Ibid*, i, 748.
— Williams, R. E. O. (1944) *Ibid*, i, 73.
Furlong, R., Clark, J. M. P. (1944) *Brit. J. Surg.* 32, 147.
Roberts, J. E. H., Tubbs, O. S., Bates, M. (1945) *Lancet*, i, 39.
Robinson, P. (1945) *Brit. med. J.* ii, 213.
White, W. L., Burnett, W. E., Bailey, C. P., Rosemond, G. P., Norris, C. W., Favorite, G. O., Spaulding, E. H., Bondi, A., Fowler, R. H. (1944) *J. Amer. med. Ass.* 126, 1016.

THE London industrial group of the Royal Society for the Prevention of Accidents is holding a conference on the Prevention of Industrial Accidents at Caxton Hall, London, S.W.1, on Monday, Feb. 25, at 10 A.M. At the opening session Dr. R. S. F. Schilling will describe the work of the Industrial Health Research Board. Further particulars may be had from the chairman of the London Industrial Coördinating Committee, R.S.P.A., 52, Grosvenor Gardens, S.W.1.

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UNILATERAL FACIAL PARALYSIS
CORRECTION WITH TANTALUM WIRE
PRELIMINARY REPORT ON EIGHT CASES

J. EASTMAN SHEEHAN
M.D. Yale, F.A.C.S.
PROFESSOR OF PLASTIC REPARATIVE SURGERY, NEW YORK POLYCLINIC MEDICAL SCHOOL

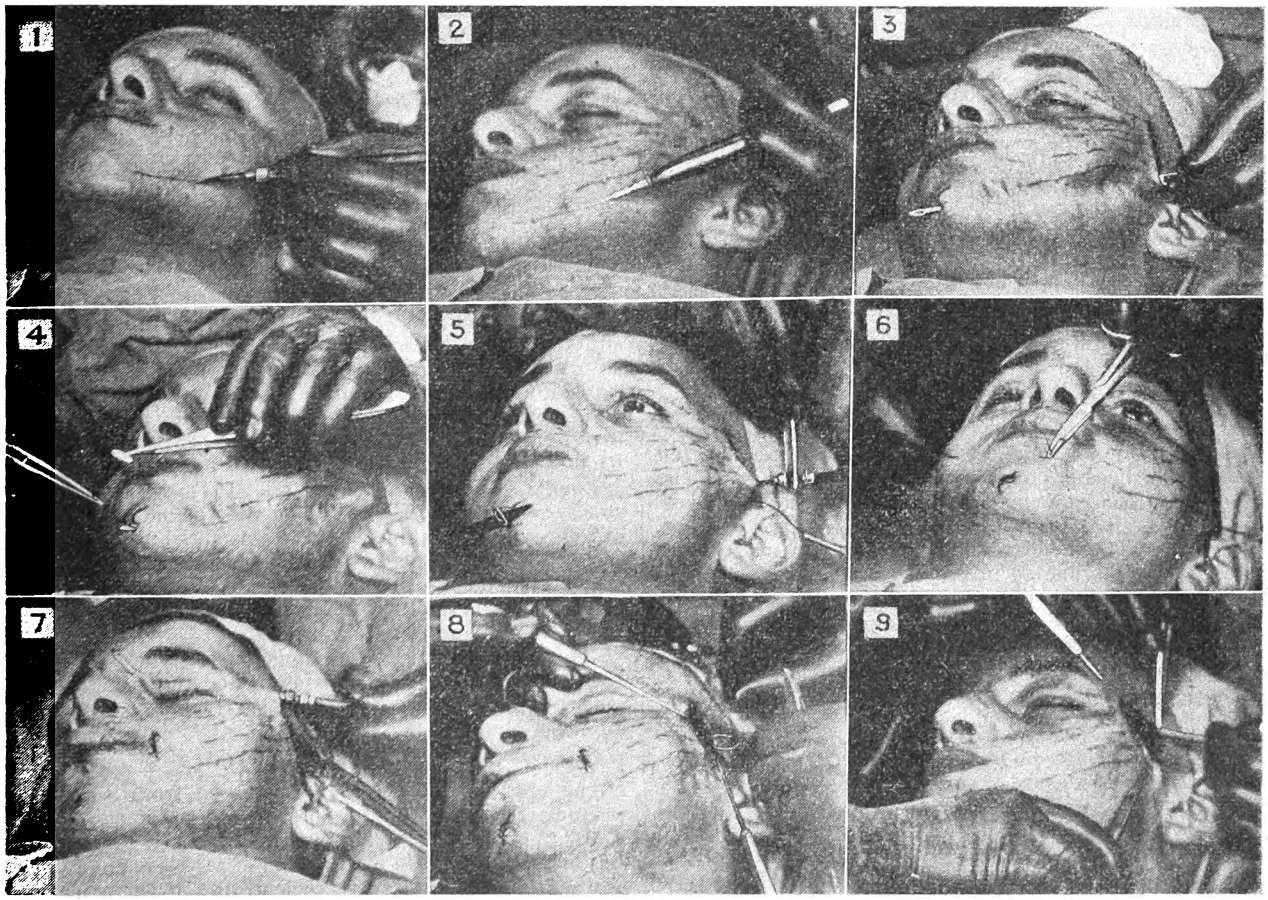
THE support of the face in unilateral facial paralysis has greatly taxed surgical ingenuity. In recent cases or those of idiopathic origin the release of pressure on the nerve is often effective. Once the period in which decompression can be successfully employed has passed, nerve grafting is the next recourse, giving brilliant results in suitable cases, as the reports of Tickle (1938) testify. In long-standing cases, where there is no longer hope of reanimation or regeneration of the nerve, reliance must be placed on traction to support and stabilise the face. Fascia strips have proved more or less satisfactory for this purpose, but the more recent use of tantalum wire (Schuessler 1944) or ribbon has several advantages: there is no need to draw on the body's fascia, and the trauma inflicted is very slight, with proportionately little hæmorrhage or swelling. The period of detention in hospital is brief, 24–72 hr. in all.

This report is based on 8 cases in which tantalum was used, as wire in the first 6 and ribbon in the last 2. The thicker ribbon was found preferable as it immobilises the parts better and tends less to give under the stress of facial motion.

SURGICAL TECHNIQUE

After the usual preparation, the paralysed side of the face is anæsthetised with 1% procaine, and a curved incision 2 in. long is made over the temporal muscle above the zygoma behind the hair-line. The temporal fascia is exposed. A long curved 18-gauge Weck needle is inserted in the lower part of the incision and passed downwards between skin and mucosa to 8 mm. beyond the midline of the chin, where it emerges. During its course the needle intermittently takes deep bites of tissue. One end of a loop of tantalum wire (or ribbon) is passed through the bore of the needle, which is then withdrawn, carrying the strand of wire back with it to the incision in the temporal area. A second needle is inserted 1 cm. above the first and follows its course 1 cm. above it. The other end of the loop of tantalum wire is passed through the bore of this needle and is carried back. A vertical incision is made on the chin to connect the upper and lower wires, and the skin on either side is undermined slightly. Tantalum foil is rolled round the loop to prevent the wire from breaking through the tissues, and the incision is closed with ophthalmic gut.

The same procedure is carried out at the angle of the mouth and on the upper lip. In the first instance the loop is affixed 0·5 cm. from the corner of the mouth. In the second the lower needle follows the course of the vermilion border to 6 mm. past the midline; the upper



1. Marking course of a tantalum wire.
2. Showing area infiltrated with procaine.
3. Wire carrier in place.
4. Wire passed through carrier, loop supported with morsel of tantalum foil.
5. Dissecting forceps placed beneath loop carrying foil before its embedment in the tissues.
6. Wound sutured.
7. All three loops of tantalum wire on face in place. Note wire carrier upper lid.
8. All four strands of wire embedded in fascia and muscle of temple area.
9. Temple incision closed.

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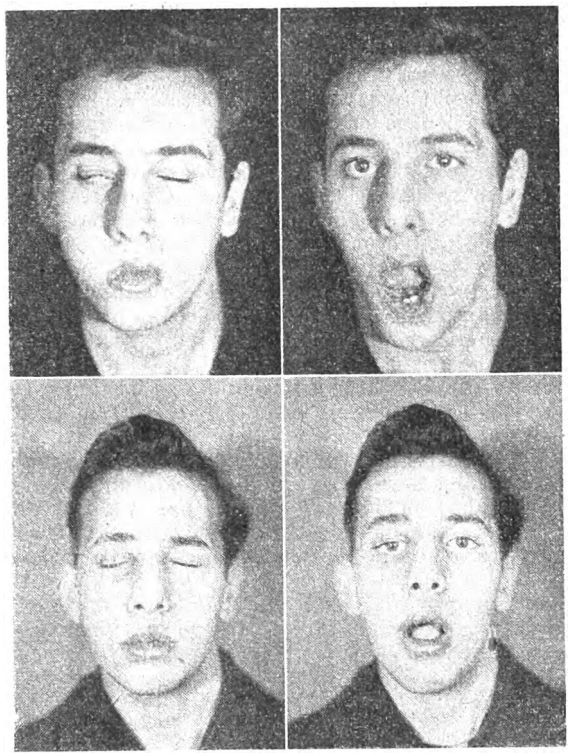

Fig. 10—Above, unilateral facial paralysis; below, after repair with tantalum wire.

runs just underneath the base of the nose, so that the pull of the wire helps to straighten the nose.

The three sets of wire (or ribbon) in the temporal incision are then pulled to overcorrect the face slightly and are held in position with clamps. The ends of each set are twisted together; any excess is cut off; and the ends are deeply embedded in the temporal muscle and fascia.

To support the upper eyelid, a needle of shorter design is inserted at the upper portion of the temporal incision and passed under the upper orbital rim, downwards and forwards to emerge over the attachment of the internal lateral ligament. A second needle, inserted 1 cm. below the first, takes a course following the lower lid and emerges beneath the attachment of the internal lateral ligament. One end of the wire or ribbon loop is inserted in the lower needle, and a vertical incision, exposing the internal lateral ligament, is made to join the upper and lower wires. The other end of the loop is then inserted in the upper needle, and both needles are withdrawn, leaving the loop moored in the internal lateral ligament. From this point the procedure is the same as for correction of the mouth. When the set of wires supporting the eyelid is securely embedded in the temporal muscle and fascia, the temporal incision is sutured, and sterile bandages are applied.

RESULTS

The original hope, in employing this technique, was simply to give a measure of support to the sagging eyelids and mouth. In all cases the results surpassed this expectation: lagophthalmos was largely or wholly overcome, and the mouth actually registered expression. However, the degree of improvement varied; 2 cases in which wire was used did not show as striking a change as the others.

Of the 8 cases 2 had previously been operated on by me with a technique employing flaps of temporal muscle (Sheehan 1935). While definite amelioration had ensued, some sagging of the mouth and lagophthalmos had persisted; and it was decided to give additional support to the eyelids and mouth with tantalum wire. The results of this double correction were so striking as to raise the question whether the combined use of muscular flaps and wire would not be desirable in all long-standing severe cases. The additional support provided by the wire is undoubtedly beneficial; and both procedures can be carried out at a single operation.

CONCLUSIONS

My experience with tantalum ribbon and wire has not been sufficient for me to pass on the manufacturer's claims that they are biologically inert. Neither have I reached a final decision on their long-term value in unilateral facial paralysis. On the basis of the 8 cases discussed here, the procedure is simple and relatively free from risk and gives immediate striking results. Certainly it is superior to those discredited methods of repair which join nerves of different numbers, producing a slight twitching of the facial muscles at best. In contrast with them, traction with tantalum ribbon or wire appears both to support and balance the face and to overcome the antagonistic pull of the muscles on the unparalysed side. It seems useful either as a permanent support—e.g., in atrophic conditions—or as a temporary one—e.g., during the regeneration of a nerve—in which case the wires can be removed after recovery.

REFERENCES

Schuessler, W. W. (1944) *Surgery*, 15, 646.
Sheehan, J. E. (1935) *Surg. Clin. N. Amer.* 15, 471.
Tickle, T. G. (1938) in Nelson's Loose-leaf Surgery of the Ear, New York, p. 355.

IN-VIVO ISOSENSITISATION OF RED CELLS IN BABIES WITH HÆMOLYTIC DISEASE

R. R. A. COOMBS *
B.Sc. Edin., M.R.C.V.S.
DEPARTMENT OF PATHOLOGY, UNIVERSITY OF CAMBRIDGE

A. E. MOURANT
D.Phil., B.M. Oxfd

R. R. RACE
M.R.C.S.

MEDICAL RESEARCH COUNCIL, EMERGENCY BLOOD-TRANSFUSION SERVICE

THIS paper records the results of tests which demonstrate the isosensitisation of the red blood-cells of babies suffering from hæmolytic disease. The sensitisation is shown by the agglutination of these cells by rabbit anti-human-globulin serum. Since the test is rapid, can be performed on a tile, and does not require anti-Rh sera, it promises to be of practical use in the early diagnosis of hæmolytic disease.

Levine, Katzin, and Burnham (1941) and numerous subsequent workers have shown that hæmolytic disease of the newborn is almost always associated with immunisation of the mother with Rh antigen. In rare cases anti-Rh agglutinin has been demonstrated in the child's serum, and Baar (1945) has shown that "incomplete" Rh antibody is relatively common.

We suggested in our previous papers (Coombs et al. 1945a and b) and have now confirmed that this in-vivo sensitisation can be demonstrated by the use of an anti-human-globulin serum.

METHOD

The red cells of the baby are freed from serum by washing three times in a large volume of saline. A 2–5% suspension in saline is then prepared. A drop of this is mixed on a tile with a drop of rabbit anti-globulin serum. The tile is gently rocked, and if agglutination is going to take place it will be obvious within 5–10 minutes. It is wise to put up two controls, using saline in place of rabbit antiserum in one and normal cells in place of the baby's cells in the other.

* With a grant from the Agricultural Research Council.

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This test will be referred to as the *direct* method, as opposed to the *indirect* method previously described, in which normal cells are first exposed to a serum suspected of containing a specific antibody, then washed, and finally exposed to the anti-globulin serum.

The rabbit antiserum agglutinates only those cells which have antibody globulin, presumably of maternal origin, adsorbed on their surface. A parallel test done in a tube at 37° C and read microscopically gave the same result as the tile test in every case. The serum of all 34 mothers was tested against cells of selected Rh genotypes with the usual agglutination technique; the serum of mothers 1–15 was also tested for the "incomplete" form of anti-Rh; and if no antibody was found by one or both of these tests the serum was further tested by the *indirect* method for its ability to sensitise cells of the genotypes Rh_1Rh_2, Rh'rh, and Rh''rh. The sera of all the control mothers were tested by the indirect method and were found to contain no sensitising antibody for Rh_1Rh_2 cells. This indirect test on the mother's serum gave further information in case 8, where it disclosed the presence of Γ, and in case 14, where it gave vital information when the father's cells were used instead of Rh_1Rh_2 and Rh'rh cells.

OBSERVATIONS ON THE CASES

The results of a preliminary trial of this direct method of detecting sensitisation of a baby's red cells are given in the accompanying table. Cases 1–15 were consecutive samples of blood sent to confirm or exclude hæmolytic disease (the order has been rearranged). Cases 16–34 were from normal families and served as a control. In none of the latter cases was there any sign of isosensitisation of the baby's cells.

Cases 1–11.—In all of these the history, together with the results of the routine Rh testing, proved the diagnosis of hæmolytic disease to be correct. The cells of the first 10 babies were shown to be sensitised. The cells of baby 11 gave a negative result. This was without doubt due to the baby being 5 weeks old and having been transfused on the

RESULTS OF TESTS

No. of case and sex	Age (days)	Babies' cells. Direct test	Babies' serum. Usual test	Babies' serum. Indirect test	Mothers' serum. Usual test	Rh and AB + O groups. Baby	Mother	Father	Pregnancy	Clinical diagnosis	Remarks
1 F	..	+	Trace Δ'	+	Δ' trace Δ	R_1r A	rr A	R_1R_1A	2	Hæmolytic disease	Transfused, recovered
2 F	3	+	–	+	ΓΔ'	R_1r A	rr A	R_1R_1A	6	,,	Recovered
3	..	+	–	Trace	Trace Δ	R_1r O	rr A	R_1R_1O	2	,,	Not transfused, died
4 F	5	+	–	+	ΓΔ	R_1r O	rr O	R_1R_2O	3	,,	Transfused, recovered
5	..	+	–	..	ΓΔ	R_1r A	rr A	R_1R_2A	2	,,	Transfused
6 F	4	+	..	..	ΔH	R_2r O	rr O	R_1R_2O	2	,,	Died
7 F	..	+	–	+	ΔΔ'	R_1r O	rr A	R_1R_1O	3	,,	Transfused, recovered
8 F	1	+	–	+	Δ'	R_1r O	R''r A	..	3	,,	,,
9 M	12–28	+	Δ'	+	ΔΔ'	"R'r" O	rr O	R_1R_2A	12	?	See text
10 F	½	+	Δ'	+	Trace Δ	R_1r A	rr A	..	3	Hæmolytic disease	Transfused, died pneumonia
11 F	35	– See text	..	..	ΔΔ'	R_2r A	rr A	R_1R_1A	3	,,	Transfused, recovered
12	3	–	..	..	..	R_1r A	R_1r O	..	..	Physiological jaundice	Recovered
13 M	27	–	..	..	–	R_1R_1O	R_1R_2A	R_1r O	2	..	Nine transfusions, slow recovery
14 M	21	+	–	..	–	R_1r O	R_1r O	R_1r O	4	..	Transfused, recovered
15 M	8	–	–	..	–	R_2r A	R_1r O	..	1	Non-obstructive jaundice	Died

No. of case and sex	Rh and AB + O groups. Baby	Mother	Father	Pregnancy	No. of case and sex	Rh and AB + O groups. Baby	Mother	Father	Pregnancy
16 M	R_2r AB	R_2R_2AB	..	2	26 F	R_2R_2O	R_2r O	R_1R_2O	1
17 M (Stillborn)	rr O	rr O	..	2	27 F	R_1r A	R_1R_2O	..	1
18 M	rr O	R_2r O	..	1	28 F	R_1r B	R_1r B	..	1
19 F	R_1R_2O	R_1R_1O	..	3	29 M	R_2r A	R_1r O	..	1
20 F	R_2r O	R_1R_2O	R''r O	2	30 M	R_1r A	rr O	..	1
21 F	R_1R_2O	R_1R_1A	..	2	31 F	R_1r A	R_1r A	..	1
22 M	R_1R_2O	R_1R_1A	..	2	32 M	R_2r O	R_2r B	R_2r A	1
23 F	rr A	R_1r A	..	2	33 M	R_1R_2A	R_2r A	R_1R_1A	1
24 M	R_1r B	R_1r A	..	2	34 M	R_1r O	rr O	R_1R_1O	1
25 M	R_2r AB	R_2r A	..	1					

Fisher	Cappell after Fisher	Wiener
Γ	Anti-C	Anti-Rh'
Δ	Anti-D	Anti-Rh_0
H	Anti-E	Anti-Rh''
Δ' "incomplete" form of Δ		

Genetic formulæ of Fisher
R_1 CDe
R_2 cDE
r cde
R' Cde
R'' cdE

Cases 16 and 18–34 were clinically normal. No. 17 was stillborn for causes unconnected with the Rh factor. In all these cases cord blood cells were negative to the *direct* test and the mother's sera contained no antibodies detectable by the usual tests.

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day before our sample was taken. Presumably the bulk of the cells were donor's cells and unsensitised cells produced after most of the antibody had disappeared from the plasma.

Case 9.—In this case the direct test showed sensitisation of the cells of the baby which appeared to be of genotype Rh'rh. The mother's serum contained both Δ and Δ′ but no Γ and so should not have sensitised Rh'rh cells. The genotypes of two sibs and the paternal grandmother, however, subsequently showed that the baby must really have been Rh_1rh, the false result being due to the "blocking" effect of Δ′, which was demonstrated in his serum. The baby's blood was sent because of a family history of numerous deaths from hæmolytic disease. At the age of 6 days he was slightly jaundiced but not anæmic. Had his cells not been found to be sensitised, the case would have been considered to be one of an Rh'rh baby unaffected by his mother's agglutinin, which was due to sensitisation by previous Rh_2rh fœtuses. The discovery of sensitisation led however to the genetic investigations, and the conclusions based on them were confirmed by the subsequent development of anæmia, the red-cell count at 28 days being 2,600,000 per c.mm. It is remarkable that the "blocking" effect at this time still remained proof against our strongest Δ serum. "Blocking" of this kind would be expected to occur frequently, but this is the first case which we have come across out of a large number investigated. For instance, in the present series both babies 9 and 10 had Δ′ in their serum, yet baby 10 reacted perfectly normally to the typing sera as Rh_1rh.

Case 12 was considered clinically to be one of "physiological" jaundice, and the serological findings supported this diagnosis.

Case 13 was sent because of jaundice and severe anæmia. Numerous immature red cells had been present, but transfusion of Rh_1Rh_1 and later Rh_1Rh_2 blood did not improve the baby's condition. He is now on the way to recovery after having nine blood-transfusions. The mother had had one previous pregnancy ending in a stillbirth. The history, the age to which jaundice persisted, the relative lack of response to transfusion, and the Rh groups and other serological findings all make an antigen-antibody reaction, as we know it, an unlikely cause of the child's anæmia. The case remains obscure.

Case 14 proved to be by far the most interesting family in the series. The baby was 3 weeks old and was anæmic but not jaundiced; it was being treated with sulphaguanidine for *Staphylococcus aureus* enteritis. There had been three previous children in this family; the first died after 12 hours, the second is alive, and the third "died suddenly soon after birth"—a history, as far as it goes, suggestive but not typical of hæmolytic disease, although complicated by sepsis. The baby's cells were found to be sensitised. With the indirect method the mother's serum was tested against the cells of 13 persons representing all the known Rh antigens and found to sensitise none of them, but it did sensitise strongly the father's cells. Here, therefore, is clear evidence of the immunisation of a mother by a fœtal antigen, not Rh, inherited from the father.

The child, mother, and father all had the same blood-groups: O, MN, Rh_1rh, "Willis" negative, "Lutheran" negative, and "Levay" negative. The last three groups are "new" ones recently described by Callender, Race, and Paykoç (1945). The Willis group is within the Rh complex; the other two are unconnected with any known group. If the mother in this family was really Rh_1Rh_0 (which cannot yet be distinguished serologically from Rh_1rh), and the father and child were Rh_1rh, then Fisher's hypothetical Rh antibody δ (Race 1944) would have to be considered; however, this antibody was absent. The antibody does not correspond to anti-P. It is hoped that it will be possible to investigate this family more fully.

Case 15 was a fatal one of jaundice without clinical anæmia. The direct test was negative, and, as in case 13, the genotypes involved and the absence of maternal antibody made Rh immunisation most unlikely.

GENERAL OBSERVATIONS

It seems that the principle involved in the test described in this paper should be applicable to the detection of mild cases of autosensitisation of red cells, and we hope to test samples of blood from cases of anæmia and of other diseases where autosensitisation may be an essential lesion.

The rabbit anti-globulin sera and sera of rabbits immunised against whole human serum which we possess do not agglutinate cells weakly sensitised with either α or β agglutinin. As yet we have not investigated this problem, but two theoretical possibilities to explain this may be suggested: (1) the anti-globulin serum does not react with the α or β agglutinin adsorbed on the red cells; (2) there are dissolved A- and B-like substances in the rabbit antisera which combine with any free "valence" of the α and β agglutinins adsorbed on the cells and so "block" the action of the rabbit anti-globulin immune body, or cause the agglutinins to be dissociated from the cellular antigen. If this were the case, the difficulty could be overcome by choosing an animal for the production of the anti-human-globulin serum which did not contain dissolved A- and B-like substances in its serum.

Only after further experience of this technique can its true value be ascertained, but these preliminary observations seem sufficiently encouraging to warrant our bringing it to the notice of workers concerned with these diseases.

PREPARATION OF RABBIT ANTI-HUMAN-GLOBULIN SERA

For this test we have used the serum of rabbits immunised either with human globulin or with human whole serum. The latter has proved as satisfactory as the former and is easier to prepare. For its preparation rabbits are injected with human serum, preferably from a group-O subject, to avoid the effect of dissolved A and B substances. The course may be similar to that used for producing an anti-human precipitating serum. When a satisfactory titre is obtained, the animals are bled. The serum after separation from the clot is inactivated at 56° C for ½ hr. The antiserum is then absorbed with very well washed A, B, and O red cells until it is shown to be free, at a dilution well below that at which it is to be used, of agglutinins to normal human red cells of any group. It is important that the cells used should be washed completely free of human serum, since even a trace of the latter will lower the effective anti-globulin titre of the rabbit serum. The serum is stored undiluted at −20° C. Sufficient antiserum for a week's work is diluted to the desired strength, such as 1/20 or lower, and kept at 0° C.

Anti-human rabbit serum prepared according to the method of Proom (1943), using an alum-precipitated antigen, has not yet been tried, but depending on which protein fraction is precipitated by the alum it may prove satisfactory.

SUMMARY

A test is described for the detection of the in-vivo sensitisation, by maternal Rh antibody, of the red-blood cells of infants with hæmolytic disease. These sensitised cells are agglutinated by an anti-human-globulin serum, whereas the cells of normal infants are not agglutinated.

An antigen and its homologous antibody, of a type previously unknown, have been disclosed by this technique.

We wish to thank the following pathologists and practitioners who have sent specimens of blood, and details of the cases, of babies suspected of having hæmolytic disease: T. H. Boon, F. E. Camps, R. J. Drummond, J. J. Dubash, H. H. Gleave, F. W. Gunz, R. C. Hill, E. J. Jolly, I. M. Morgans, Brenda Morrison, G. R. Osborn, Margaret Swinburne, and Stanley Wray. We would also like to thank Dr. A. Hanton, Dr. C. Arango, Sister Kegel, and Sister North, of the County Hospital, Cambridge, for the trouble they took to provide us with samples of blood from the normal babies and their mothers.

REFERENCES

Baar, H. S. (1945) *Nature, Lond.* **155**, 789.
Callender, S., Race, R. R., Paykoç, Z. V. (1945) *Brit. med. J.* ii, 83.
Coombs, R. R. A., Mourant, A. E., Race, R. R. (1945a) *Lancet*, ii, 15; (1945b) *Brit. J. exp. Path.* **26**, 255.
Levine, P., Katzin, E. M., Burnham, L. (1941) *J. Amer. med. Ass.* **116**, 825.
Proom, H. (1943) *J. Path. Bact.* **55**, 419.
Race, R. R. (1944) *Nature, Lond.* **153**, 771.

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NICOTINAMIDE DEFICIENCY PRECIPITATED BY SULPHAGUANIDINE

S. W. HARDWICK
M.D. Lond., M.R.C.P., D.P.M.
DEPUTY MEDICAL SUPERINTENDENT, WEST PARK HOSPITAL, EPSOM

DRUGS such as sulphaguanidine and succinylsulphathiazole are now used widely in the treatment of acute bacterial dysenteries because of their "sterilising" effect on the bacterial flora of the gut. Both drugs have also been used experimentally in animals and in man to prove that the intestinal flora can synthesise certain B vitamins (Daft et al. 1942, 1943, Nielsen and Black 1944, West 1941, Light et al. 1942, Najjar and Holt 1943, Najjar et al. 1944). Ellinger and Coulson (1944) observed that in man the urinary elimination of nicotinamide methochloride was greater than would be expected from the intake of nicotinamide. Subsequently it was demonstrated that the urinary output of nicotinamide methochloride was diminished on an average by 60% after the administration of succinylsulphathiazole, both in healthy human subjects and in pellagrins (Ellinger et al. 1944, 1945). These experiments were interpreted as a demonstration of biosynthesis of nicotinamide in the gut. The following case furnishes clinical evidence in support of this contention.

CASE-RECORD

A woman, aged 58, with manic-depressive psychosis, had been restless and difficult to nurse for several months. Her weight had fallen to barely 7 stone (normal average 8½–10 st.). Barbiturates and paraldehyde were used as sedatives. In the past year she had had recurrent furuncles and carbuncles, sulphanilamide or sulphathiazole being given on three occasions. One healing carbuncle was dressed with sterile sulphathiazole powder. No signs indicating a deficiency state were encountered during treatment with these drugs, but five days after the termination of a 20-g. course of sulphanilamide in January, 1945, the patient suddenly developed lesions on the lips, buccal mucosa, chin, and front of the upper chest. From their appearance and distribution it was deduced that she must have inadvertently scalded herself by attempting to drink hot fluid. (Considered retrospectively, there was some doubt about this interpretation, and in view of the subsequent history an underlying deficiency condition may well have been existent at the time and played some rôle in the observed signs.) "Healing" took some ten days.

In April, 1945, the patient had a severe attack of dysentery (Flexner), and sulphaguanidine was prescribed. On the third day of medication, April 13, when some 30 g. had been administered, a rash developed. The skin over the upper and lower jaws was reddened and œdematous but had a rather odd appearance of being covered in part by patches of thin white membrane. The front of the neck was erythematous, the lower border extending slightly to the upper chest in the shape of a V. Two large discreet areas of erythema were present over the right cheek and right side of the neck. There was cracking (linear ulceration) at the angles of the mouth. The whole of the palate and the upper and lower edentulous gums presented a milky appearance, as though covered by a thin white film. The tongue did not appear to be involved. Apart from some pigmentation over the back of the neck and roughened pigmented patches over the posterior surfaces of the elbows, no other abnormality of skin or of mucosa was noted. The patient had remained indoors during the acute illness and had not been exposed to the sun.

Nicotinamide was administered subcutaneously, 100 mg. each day for three days, and sulphaguanidine was continued (50 g. given in all in seven days). There was prompt improvement, and by April 17 the acute lesions of skin and mucosa had vanished, except the lower lip and a narrow band of adjacent skin, which remained red, œdematous, and bleeding as a result of interference by the patient.

Riboflavine (by injection), yeast, and, later, larger doses of nicotinamide were given, but the patient remained capricious with diet, either refusing food or ravenously devouring large quantities. On the 29th she relapsed into a quiet exhausted condition. Before she died on May 1 she had dysphagia, a slow pulse, relaxed stools, vomiting, and twitchings of the orbiculares palpebræ.

Autopsy.—"Lungs œdematous and engorged at bases. Coronary arteries grossly atheromatous. Milky patches over anterior and posterior ventricular walls. Brown atrophy of heart muscle. Liver slightly enlarged, engorged, and 'cyanotic.' Small granular kidneys. Hyperæmic patches in large intestines, particularly in pelvic colon, becoming progressively less higher up bowel. Mucous membrane in ascending colon appeared normal; no ulceration."

Brain.—"No gross macroscopic changes. Histological examination reveals that many of the Betz cells, cells of the pontine nuclei, and of the nucleus ambiguus and arcuatus in the medulla have undergone severe chromatolysis of the type known as retrograde degeneration. This nerve-cell change, particularly if found in many regions, is very suggestive of pellagra. There was no hyaline change of the blood-vessels or increase of lipofuchsin. Cyto- and myeloarchitecture was normal in all regions examined."

DISCUSSION

The acute dermatitis and the ulceration at the angles of the mouth in this ill and poorly-nourished patient suggested an acute vitamin-B deficiency. The dramatic response of the skin lesions and of the peculiar mucosal changes to nicotinamide, particularly during sulphaguanidine administration, further strengthened the supposition, and the histological findings in the brain confirmed the diagnosis of pellagra.

Presumably several factors contributed. Probably the amount of vitamin-B intake by mouth was insufficient owing to the feeding difficulties, the dysphagia and vomiting before death, &c. The acute infection per se would be likely to accentuate tissue demand, and the inflammation of the bowel wall and the diarrhœa due to dysentery may have interfered with absorption. The sudden advent of deficiency signs during sulphaguanidine therapy suggested, however, that the drug was a contributory and perhaps the crucial factor.

A considerable amount of experimental evidence has revealed a close connexion between the vitamin-synthesising activities of certain intestinal organisms and the adverse effect of the "sterilising sulphonamides" on them. Thus, Ellinger and his co-workers have shown that nicotinamide is synthesised and released by bacteria in the human gut and absorbed into the blood-stream; the vitamin supply from the source is profoundly reduced almost immediately after the administration of sulphaguanidine or succinylsulphathiazole. Further, a severe intestinal infection such as acute dysentery or typhoid may precipitate a deficiency state. Benesch (1945) has demonstrated that intestinal bacteria can destroy nicotinic acid in certain circumstances, and has suggested that sterilising sulphonamides may disturb the equilibrium between nicotinic-acid-producing and nicotinic-acid-destroying organisms in favour of the latter.

It would be logical to anticipate that other cases must occur; but, so far as I am aware, no similar cases have been reported. At West Park Hospital Flexner's dysentery is unfortunately a common disease, and the "sterilising sulphonamides" are almost invariably prescribed. I have seen at least two other cases of acute deficiency syndrome, probably precipitated in like manner to the case described. In perusing the somewhat extensive literature on sulphonamide rashes, one cannot help suspecting that some of the reactions reported, particularly after sulphaguanidine and succinylsulphathiazole, are in reality pellagrinous.

The terminal dysphagia, vomiting, and bradycardia may have been of bulbar origin—possibly a common mode of death in severe pellagra.

SUMMARY

An acute nicotinamide deficiency was probably precipitated by sulphaguanidine in a psychotic patient who had developed acute dysentery (Flexner).

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AN EPIDEMIC OF PNEUMONIA IN WEST AFRICA

E. HINDEN
M.B. Camb., M.R.C.P.
CAPTAIN R.A.M.C.; GRADED PHYSICIAN TO A WEST AFRICAN CASUALTY CLEARING STATION

THE liability of the African to contract lobar pneumonia has been noticed before, particularly in the South African mining communities, and there were usually 2–3 cases of pneumonia admitted weekly to the C.C.S. During June and the first half of July, 1943, the incidence had been low—less than 2 cases weekly. But 12 cases were admitted in the last week of July, and 16 cases the week after. It was soon seen that this increased incidence was not confined to these two weeks but was the beginning of a definite epidemic.

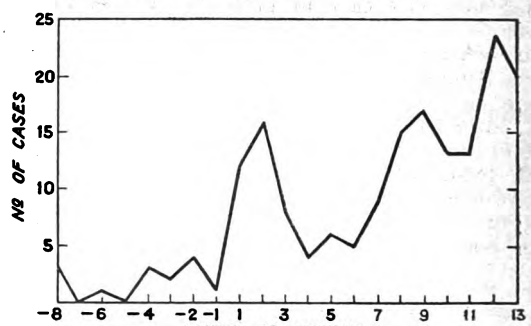
EPIDEMIOLOGY

The week July 25–31 is the first week of the epidemic and will be called week 1. The subsequent weeks are numbered 2, 3, &c., and the previous weeks are numbered backwards as − 1, − 2. The figure shows graphically the weekly admissions for the weeks − 8 to 13; there were 161 cases in the thirteen weeks of the epidemic.*

The station served by the C.C.S. consists of several units, the biggest of which, unit X, is a training depot, and there is a constant stream of new recruits arriving at this unit and leaving eight weeks later. The other units are much smaller, and their personnel is more or less constant. The great bulk of the pneumonia patients came from unit X—142 out of the total of 161 cases. The unit is made up of three groups of soldiers: their permanent staff of about 350; new recruits fresh to the Army; and soldiers posted to the unit pending permanent posting elsewhere. Table I shows the relations between the size of the unit and the number of cases at different dates.

It was thought at first that the brunt of the epidemic was falling on the new recruits. Table II shows the distribution of the patients according to the length of service; all those with more than eight weeks' service are taken to be permanent staff. From these figures and the strength figures of table I it appears that the weekly attack-rate per thousand newcomers at risk was 6·12, and for the permanent staff 5·93—virtually the same. Table II shows that even among the newcomers the morbidity-rate was fairly uniform during their eight weeks' stay. All classes of soldiers were equally affected, irrespective of how long they had been in the unit.

A perusal of table I shows a striking rise in the number of cases of pneumonia whenever the total parade strength exceeded 1400. This is well brought out in table III, which shows the incidence-rates per thousand in the different weeks, divided into two groups: group A, when the total parade strength is less than 1400; and group B, when it exceeds that figure. These groups are obviously dissimilar; the rates in group A have a mean value of 1·35 (standard deviation 0·94); from group B the mean is 6·77 (standard deviation 1·52). The test for random sampling shows that the large difference between the means of the two series is most unlikely to be due to chance alone. During the thirteen weeks of the epidemic the small units had 19 cases of pneumonia; their total average strength was about 1000. This gives a weekly incidence of 1·46 per 1000—very much the same as in group A. It therefore seems that, when the total strength of unit X was below 1400, the weekly incidence of pneumonia per 1000 men was 1·35, very much the same as in the neighbouring units; but, when the strength rose above 1400, the attack-rate rose sharply to 6·77—five times the previous rate.



Weekly admissions to hospital.

PREVENTIVE MEASURES

During the second week of the epidemic a conference was called to devise steps to lessen the incidence. This period coincided with the entry of a batch of recruits from rather a remote part of the area, and it was thought that local conditions might be very different from those they were used to in their native villages. These recruits were unaccustomed to the food served at the station and being, like all Africans, extremely conservative in their diet were not eating it. So different rations were ordered, and rather more than those given to the ordinary soldier. Physical training before breakfast was forbidden, a rest period was instituted every afternoon, ventilation was improved, and an all-night picket started to ensure that the windows were kept open (the African likes to close all doors and windows before going to sleep), bed spacing was increased, and the men slept head to foot.

These measures completely failed to affect the course of the epidemic. Later I discovered that new recruits from any part of the area fell a prey to the epidemic, and altering their conditions of living in the unit was quite useless. The one factor which we could not control was the herding together of large numbers of people in a common life, people who before that time had lived in villages of about 100 souls. It seems that the mere concentration of susceptibles is sufficient to start the epidemic, even though all other conditions of the environment make for the maintenance of good health.

CLINICAL PICTURE

The cases admitted during the epidemic numbered 161. In at least 120 (75%) the clinical picture was typical of pneumonia and consequently need not be described here. But the remaining 41 (25%) showed variations.

Rigors and vomiting were not common and suggested concomitant malaria.

* The epidemic continued. There were 60 cases in the fortnight following the period covered by this article, including the first death from pneumonia and the first empyema.

DR. HARDWICK (*continued from preceding page*)

I am indebted to Prof. P. Ellinger, of the Lister Institute, for his criticism and advice; Dr. A. Meyer, of the L.C.C. Central Pathological Laboratory, for the histological examination and report on the brain; and Dr. W. A. Caldwell, medical superintendent of West Park Hospital, for the autopsy report and for permission to publish this case.

REFERENCES

Benesch, R. (1945) *Lancet*, i, 718.
Daft, F. S., Ashburn, L. L., Sebrell, W. H. (1942) *Science*, **96**, 321.
— Endicott, K. M., Ashburn, L. L., Sebrell, W. H. (1943) *Proc. Soc. exp. Biol., N.Y.* **53**, 130.
Ellinger, P., Benesch, R., Kay, W. W. (1945) *Lancet*, i, 432.
— Coulson, R. A. (1944) *Biochem. J.* **38**, 265.
— — Benesch, R. (1944) *Nature, Lond.* **154**, 270.
Light, R. F., Cracas, L. J., Olcott, C. T., Frey, C. N. (1942) *J. Nutrit.* **24**, 427.
Najjar, V. A., Holt, L. E. jun. (1943) *J. Amer. med. Ass.* **123**, 683.
— Johns, G. A., Medairy, G. C., Fleischmann, G., Holt, L. E. jun. (1944) *Ibid*, **126**, 357.
Nielsen, E., Black, A. (1944) *Proc. Soc. exp. Biol., N.Y.* **55**, 14.
West, R. (1941) *Ibid*, **46**, 369.

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TABLE I—NEWCOMER PARADE STRENGTH AND TOTAL PARADE STRENGTH IN DIFFERENT WEEKS, AND THE NUMBER OF CASES OF PNEUMONIA IN UNIT X

Weekly serial no.	Newcomer parade strength	Total parade strength	Cases	Weekly serial no.	Newcomer parade strength	Total parade strength	Cases
−8	573	923	2	4	924	1274	3
−7	423	773	0	5	828	1178	2
−6	442	792	1	6	960	1310	3
−5	578	928	0	7	1152	1502	8
−4	750	1100	2	8	1352	1702	14
−3	801	1151	1	9	1595	1945	14
2	900	1250	3	10	1897	2247	12
−1	1039	1389	0	11	2110	2460	12
1	1231	1581	11	12	2290	2640	22
2	1282	1632	15	13	2189	2539	19
3	1133	1483	7				

The total strength = newcomer strength + 350 permanent staff.

Temperature occasionally, after the ambulance journey, was low, but it soon rose.

Jaundice was noted in 19 cases (12%).

Physical Signs in the Chest.—Sometimes there were no findings in the chest, or at most a slightly diminished air entry. Most of such cases soon developed the usual signs; but some, with a short history, never showed any chest signs; the fever, which was 105° F on admission, dropped to 97° F after twenty-four hours, and then never exceeded the normal. I believe that such cases are examples of true pneumococcal septicæmia in which the infection is overcome by the drug before it can become localised in the lungs.

TABLE II—LENGTH OF SERVICE OF PERSONNEL CONTRACTING PNEUMONIA

Length of service	No. of cases	Length of service	No. of cases
Under 1 week	14	6–8 weeks ..	24
1–2 weeks ..	13	More than 8 weeks (permanent staff)	27
2–3 weeks ..	12		
3–4 weeks ..	30		
4–6 weeks ..	22	Total	142

DIAGNOSIS

During the height of the epidemic all sorts of cases, including T.A.B. reactions, malaria, and dysentery, came into hospital labelled pneumonia. Such diagnoses were corrected after a day under observation, but in 15 cases the diagnosis of pneumonia made after admission had to be changed. The correct diagnoses were as follows:

Pulmonary tuberculosis	3	Malaria	3
Bronchitis	3	Hepatitis	3
Asthma	1		
Pleurisy with effusion ..	1	Measles	1

On other occasions great difficulty was experienced in differentiating between a right basal pneumonia and an amœbic hepatitis; at times the response to treatment was the only criterion. Only 1 case of pneumonia was missed, having been diagnosed as tuberculosis.

COMPLICATIONS

One complication was a very poor response to the drug. Some such cases had persistent fever for 4–5 days, the temperature ultimately dropping by slow lysis; in others the fever abated as usual after two days, but there was a secondary rise after the third day, which required more sulphonamide to control it. Most of such patients, however, did well in the end, and their stay in hospital was not increased by more than a few days. There were 18 such cases (11·25%).

The other main complication was delayed resolution. Here the temperature dropped normally with treatment, but the signs in the chest, cough, and pain persisted. The sputum, repeatedly examined, showed pus and pneumococci in large numbers but never acid-fast bacilli. A few poor responders passed into this group too. There were 9 such cases, and the average stay in hospital was increased from fifteen days (the average for the uncomplicated) to thirty-three days; a few of the patients still had signs in the chest on discharge, and 2 of them had to be temporarily down-graded.

TABLE III—STRENGTH, NUMBER OF CASES, AND RATES PER THOUSAND: GROUP A, STRENGTH LESS THAN 1400; GROUP B, STRENGTH MORE THAN 1400

Group A				Group B			
Week	Strength	No. of cases	Rate	Week	Strength	No. of cases	Rate
−8	923	2	2·15	1	1581	11	6·95
−7	773	0	0	2	1632	15	9·2
−6	792	1	1·25	3	1483	7	4·7
−5	928	0	0	7	1502	8	5·35
−4	1100	2	1·8	8	1702	14	8·25
−3	1151	1	0·85	9	1945	14	7·2
−2	1250	3	2·4	10	2247	12	5·35
−1	1389	0	0	11	2460	12	4·9
4	1274	3	2·35	12	2640	22	8·35
5	1178	2	1·7	13	2539	19	7·5
6	1310	3	2·3	..	..	..	..

Spread of the inflammation to another part of the lung, while yet under treatment, with an exacerbation of all symptoms, occurred twice; in each case the spread was from the right base upwards.

Pleural effusion occurred once. This was sterile, and after one aspiration the rest of the fluid was absorbed, the patient making a very fair recovery.

There was no case of empyema in these 161 cases. Concurrent disease was noted in 5 patients (see table IV).

TABLE IV—COMPLICATIONS AND CONCOMITANT DISEASE COMPARED WITH DRUG USED

Complication or Concomitant	Sulphapyridine	Sulphadiazine
Delayed resolution	7 (6%)	2 (4·3%)
Slow response and/or secondary rise	14 (12%)	4 (8·5%)
Spread of disease	2 (2%)	..
Pleural effusion	..	1 (2%)
Total	23 (20%)	7 (14·8%)
Measles	1	1*
Mumps	1	..
Scabies	..	1*
Malaria	..	2

*The man who had measles also had scabies.

TREATMENT

Treatment was with sulphonamides. Sulphapyridine was used mainly, in 113 cases; sulphadiazine was obtainable towards the end of the period and was then used alternately with sulphapyridine; it was given to 46 patients. Sulphathiazole was used once only; and 1 patient received no specific treatment. The dosage adopted was 6, 6, 5, 4, 3 g. on consecutive days—24 g. in five days. On a few occasions, when the response was a little slow, the drug was given for an extra day.

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Sulphapyridine and sulphadiazine were extremely satisfactory; in most cases the pneumonia responded at once and cleared without sequelæ. Few patients were discharged before the fourteenth day, but many on that day. This was a matter of deliberate policy; previous experience had shown that discharge before the fourteenth day led to relapses. There was no case of relapse or second attack in this series; but 1 man, treated for pneumonia elsewhere and discharged on the eleventh day, sustained a second attack two weeks later.

RESULTS

All the 161 patients recovered and left hospital, 148 of them in twenty-one days or less; 2 only required down-grading, the other 159 men being fit and returned to duty. This satisfactory outcome is due in great measure to the sulphonamides; without them it is hardly credible that there should have been no deaths among so many sick men. It was remarkable, too, how quickly most of the patients recovered. It was no uncommon sight to see an African soldier extremely ill the first day, eating heartily the second day, and running about the ward on the third (the African dislikes lying in bed). It was no hardship for these men to return to duty in two weeks—they were asking for their discharge after the first seven days.

While there were no deaths in the pneumonia patients, 4 men died from pneumococcal meningitis. There were 5 cases of this uncommon disease in three months in this small station—a very high incidence. There was only 1 case of meningococcal meningitis during the same period, and this disease is usually much the commoner of the two. Considering the pneumonia and the meningitis together as "pneumococcal disease," the effect of a pneumococcal onslaught on the community, it seems that we can divide the population into two portions—the majority, with fair resistance to the germ, contract pneumonia and live, but the small moiety who are unable to localise the infection to their lungs develop meningitis and die.

SUMMARY

An epidemic of pneumonia broke out among the African troops at a small station; 161 patients were admitted to hospital in thirteen weeks.

Of these, 142 came from one unit, which had a continual flow of new recruits arriving for their primary training.

The incidence fell on all soldiers alike; there was no special predilection for the new recruits.

When the total strength of the unit was below 1400, the weekly incidence was 1·35 per thousand (the same as in neighbouring units); but when the strength exceeded this figure the rate rose sharply to 6·77. It is most unlikely that this difference is due to the errors of random sampling.

Improvements in dieting and living accommodation were ineffectual in controlling the epidemic.

Treatment was with either sulphapyridine or sulphadiazine in the dosage of 24 g. in five days. Both drugs were very effective, and there is nothing to choose between them.

All of the 161 patients recovered; 148 (92%) were discharged in three weeks or less. The only important complication was delayed resolution, which occurred 9 times (5·6%). Empyema did not develop, though there was one sterile effusion in the series.

I wish to thank Major S. F. Mitchell, R.A.M.C., for permission to publish this article and for his assistance; Major Elphinstone, of G.H.Q. West Africa, for his criticisms of the statistical section; Captain Coulter, adjutant of unit X, for the figures of table I. My African nursing orderlies, Sgt. T. Suglo and L/Cpl. D. Danso, were responsible for the nursing of all the cases.

Medical Societies

ROYAL SOCIETY OF MEDICINE

At a meeting of the section of experimental medicine on Feb. 12, with Dr. E. N. Allott, the president, in the chair, a discussion on the

Treatment of Syphilis with Penicillin

was opened by Lieut.-Colonel J. M. Marshall, who referred to the disadvantages of the standard treatment of syphilis with arsenicals and bismuth—toxicity and the difficulty of ensuring regularity over a long period. Under war-time conditions the latter difficulty had increased, so that even in the British Army no more than 50% of cases had received adequate treatment. Attempts to hasten cure by intensifying arsenical therapy increased the incidence of toxic effects. Penicillin, with its promise of rapid cure in early syphilis without dangerous toxic effects, was therefore hailed enthusiastically. Assessment would require at least five years, so that plans of treatment were necessarily experimental. But experiments had been on a vast scale, and some conclusions were now permissible.

Early syphilis had been treated mostly with multiple intramuscular injections of aqueous solutions of penicillin, and the immediate results, largely independent of dosage, were the disappearance of *Treponema pallidum* from surface lesions in about 12 hours, followed by rapid healing of lesions and reversal of positive blood-serum reactions to negative. Inadequate dosage was followed by clinical or serological evidence of relapse, the incidence of which was, up to a point, inversely proportional to the size of the dose. Most patients had received injections of 40,000 units every three hours for 60 doses. Treatment thus occupied 7½ days and the total amount of penicillin was 2,400,000 units. In 5000–8000 men of the United States Army in Europe the proportion of clinical relapses after this treatment was 1–2%, while 13% of the patients followed for six months showed persistently positive blood tests. In Colonel Marshall's own group of 67 cases followed for six months there were 10 failures, of which 8 relapsed. In 7 of these patients relapse took the form of infectious surface lesions. At the Military Hospital, Preston, 105 such cases had been followed for six months, and there had been 16 failures of treatment, with infectious surface lesions in 14 cases. A War Office survey of 270 cases observed for six months showed that relapse occurred in 8%; and Dr. Moore of Baltimore had stated that in a large series of cases followed for eight months after similar treatment relapse occurred in 7%. Colonel Marshall had been dissatisfied with his own results in the treatment of early syphilis with penicillin alone, for the number of early infectious relapses was much higher than he had seen with intensive treatment with arsphenoxide and bismuth given daily for 20 days. He had evolved a method of combining penicillin and arsphenoxide, based on experiments with animals by Dr. Selbie, and on the suggestion that there was a synergistic action between the two drugs. At first 120 patients had received the routine course of penicillin, with concurrent administration of 14 intravenous injections of 0·09 g. of 'Neo-Halarsine' or 0·06 g. of 'Mapharside,' one injection being given daily for two days in every three, so that treatment lasted twenty days. Later 240 patients received penicillin combined with 10 daily injections of 0·06 or 0·09 g. of arsphenoxide, according to the preparation used. Toxic effects were uncommon, but if they occurred arsenicals were discontinued and the penicillin injections continued for 100 injections with a total dosage of 4,000,000 units. A third of these 360 patients had been followed for four to six months; 5 had developed infectious lesions but at least one had probably been reinfected. Over 500 patients had been treated similarly at the Military Hospital, Preston, but effective follow-up had not been possible; 3 cases of surface relapse had been traced. From this evidence the combined treatment seemed to be an improvement on penicillin alone in present dosage. This double treatment seemed almost without danger, although one of Colonel Marshall's own patients suffered from arsenical encephalopathy, but recovered. Patients who relapsed after treatment with penicillin alone received 4,000,000 units of penicillin and ten daily injections of

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arsphenoxide. Large-scale experiments had been begun in military hospitals in which two methods of treatment were now used: 1000 cases were to be treated with 2,400,000 units of penicillin plus 10 daily injections of arsphenoxide, and the same number would receive 4,000,000 units of penicillin alone. For civilians Colonel Marshall's method was to begin a course of arsenicals and bismuth lasting ten weeks and to admit the patients to hospital for 2,400,000 units of penicillin as soon as this was possible. Few had received this treatment and assessment was not yet possible.

In late syphilis, lesions of the skin and bones responded rapidly to penicillin in most cases, and Colonel Marshall had seen good results with gumma of the testicle. Results with interstitial keratitis were less satisfactory. In a small number of cases of neurosyphilis he could confirm the reports of American experts that clinical improvement occurred in some of them with progressive improvement in abnormalities of the cerebrospinal fluid. He favoured a first course of 4,000,000 units of penicillin, followed by arsenicals and bismuth and further courses of penicillin if necessary. In treating late syphilis it was important to begin with small doses because of the danger of "therapeutic shock." Reports showed that penicillin was valuable for the treatment of pregnant women with syphilis, both for its effect on the mother and the unborn child. For infantile congenital syphilis doses of from 16,000 to 32,000 units of penicillin per kilogramme had been recommended.

Dr. F. R. SELBIE described experiments in the treatment of rabbit syphilis with neoarsphenamine, with penicillin, and with the two drugs combined. The minimum effective doses of the two drugs were, weight for weight, about the same; but when they were given simultaneously, the same effect could be produced with a quarter the dose of neoarsphenamine and half the dose of penicillin. Thus there appeared to be a distinct advantage in combining arsenic and penicillin in the treatment of rabbit syphilis, as far as the immediate effect was concerned. The ultimate results of treatment with arsenic alone depended on the dose. Twice the minimal effective dose was usually sufficient for cure. This finding did not hold for penicillin. Rabbits were treated with increasing doses of penicillin from 1500 to 30,000 units. In all there was an immediate dramatic effect, as with arsenic, but most of the chancres relapsed, and the incidence of cures had no relation to dose. The biggest dose failed, and it was nearly seven times greater than the minimal effective dose. Lasting effect seemed to depend on the ability of the rabbit to develop immunity processes. A combination of the two remedies was used by giving the minimal effective dose of neoarsphenamine with the graded doses of penicillin used in the other experiment. The results were perhaps slightly better than with the same dose of arsenic alone; but relapse occurred in the animals which received the two largest doses of penicillin, so that again the curative effect of penicillin was not closely related to the dose. Dr. Selbie found his experiments disappointing; but he thought they did show that penicillin had a rapid and dramatic effect on rabbit syphilis comparable to that of the arsenicals. The effect did not last, however, and it seemed to him that if penicillin was combined with arsenic in clinical practice the dose of arsenic should not be cut down to less than half of the usual dose.

Mr. A. J. KING said that the immediate effectiveness and lack of toxicity of penicillin had raised the hope that it was the long-awaited ideal remedy. To assess its value would take time and care, and its use as routine treatment in the Armed Forces was a gamble necessitated by conditions of movement and breakdown of standard methods. The immediate impression was that the treatment had justified itself, but judgment must be deferred. The fact that many hundreds of patients with early syphilis, from a controlled and disciplined group, had been treated with standard dosage of penicillin alone should provide the means for a short cut to knowledge which otherwise would take years to acquire. The only studies on a scale large enough to be significant were those in which the dosage of 2,400,000 units had been given in the 7½-day period. Comparing Marshall's figures and those from the Military Hospital, Preston, with the large series from the U.S. Army described by Pillsbury, the proportion of failures after six months' observation was the same—15%. But in the British series the proportion of actual clinical relapses was much higher. This was probably not significant, because in early syphilis under treatment persistence and relapse of positive serum reactions were strong pointers to the probability of clinical relapse.

Mr. King then discussed the cases of clinical relapse in Marshall's series, amounting to 12% of the total, in relation to the observation of the Coöperative Clinical Group in the United States that, with standard treatment of syphilis, 45% of the total of relapses occurred within six months of the completion of treatment. On this basis it was possible to estimate that failure of treatment in this series would ultimately be 31%. This might be an overestimate if there was a close analogy between the effects of the organic arsenicals and penicillin, both of which were quick-acting remedies, quickly absorbed and quickly excreted. When the organic arsenicals were given alone in inadequate dosage they tended to shorten the latent period of relapse. With intensive arsenotherapy the majority of relapses occurred within six months and almost all within the year. It was reasonable to suppose that the cycle of relapse and progression might also be hastened by penicillin. Figures from the published results of the Coöperative Clinical Group showed that in 3244 cases treated with standard measures the incidence of treatment failures of all kinds in patients with primary and early secondary syphilis was 26·6%. Some of these had had irregular and inadequate treatment, but the comparison seemed fair, although almost all the patients with penicillin must have completed their treatment satisfactorily. Irregularity of treatment and drug intolerance were hazards inherent in the standard methods of treatment, and must be accepted in such a comparison. As far as it went, it did not indicate that penicillin had failed. Many planned investigations were required with the most accurate and complete follow-up possible. An immense amount of vital information must now be available in the War Office central syphilis register, and it was disappointing that no more than 270 cases were cited from this source. There was a good case for setting up an organisation to follow these patients in civil life, and, by coöperation with the public clinics, study their cases and serum reactions during the next few years. There was evidence that relatively few of these men were having their follow-up tests as civilians. Results of treatment with penicillin alone, as far as they were known, were not good enough for complacency. Results with combined penicillin and arsenicals were interesting. Marshall's method was based on the intensive form of arsenotherapy called "20-day treatment," which required the highest standards of observation and nursing care. An estimate in 1943 had put the mortality at 1 in 400 cases, although Pillsbury and his colleagues had since treated over 3000 patients by this method with no deaths. Marshall had had no deaths in his 360 cases, but his one case of arsenical encephalopathy was in serious danger because the case-mortality from that complication was 50%.

Some aspects of the value of penicillin could already be stressed. Its value for defaulting and uncoöperative patients, and for those who could not tolerate the standard remedies, was obvious. It had been suggested that most early syphilitics would get well even with apparently inadequate treatment, whereas a proportion would be difficult to cure even if fully treated, because their immunity processes were deficient. When the optimum dosage of penicillin was known it might throw into sharp relief these resisting cases and enable them to be identified early. To these the more radical measures of intensive arsenotherapy or artificial fever could be applied. The present need was full assessment of the results already obtained, after which further investigations of the value of penicillin alone could be planned.

Brigadier T. E. OSMOND thought that history was repeating itself. When "606" was first introduced there was hope of quick cure with small dosage. The amount of the drug had to be increased and times of administration extended, and finally heavy metal was given in addition. The dosage of penicillin should be increased, if necessary, to ten times the present amount,

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and should be supplemented with both arsenic and bismuth in increasing amounts, according to the duration of the infection. The importance of adding arsenic was being overstressed. He thought that bismuth would prove to be more important, because penicillin and arsenic were similar in rapid action and excretion. He appealed also for acceptance of a standard quantitative serum test of high quality, to aid assessment. He was sceptical about the so-called "reinfections"; most of these were relapses and in all cases of doubt should be accepted as such.

Surgeon Captain T. LLOYD-JONES had continued his investigations into the effect in early syphilis of daily single doses of penicillin in aqueous solution. He had treated 370 cases of primary and secondary syphilis in this way, and followed 295 of them for one to seventeen months, and 105 from one to four months. In 223 cases of primary syphilis there were 12 relapses. The remaining 75 cases had been observed for less than a month. For primary syphilis he thought that the dosage should not be less than 3·9 mega units; and for secondary cases not less than 4·8 mega units. He found intravenous and intramuscular injections equally effective but the latter were more convenient. For primary syphilis he gave 300,000 units daily for thirteen days or 500,000 units daily for eight days. For secondary syphilis he gave 300,000 units daily for sixteen days or 500,000 units daily for ten days.

Miss GLADYS SANDES described her experiences in treating congenital syphilis in infants and young children with penicillin. In those with florid lesions the mortality was high, but this had been reduced by penicillin. To treat such patients with penicillin in the first instance gave severe "catarrhal reactions," which were presumably due to therapeutic shock. She therefore began treatment with arsenic for the first two weeks, and then gave penicillin; 20,000 units had been given every three hours for five days, omitting one dose at night; a few had received 40,000 units three-hourly. These large doses were well tolerated. The standard dosage for children aged between one and five years was 750,000 units. The type of case in which there were few symptoms and signs, but the serum reaction was positive, responded indifferently to penicillin. Bone lesions cleared up very well, and cases of asymptomatic neurosyphilis were satisfactorily improved. The only complication of treatment had been local irritation at the site of injection. This was rare, but intractable when it occurred.

Colonel L. W. HARRISON supported Brigadier Osmond's view that the analogy with "606" was a strong one. He described investigations on substances which retarded absorption of penicillin, in which 24 centres had collaborated with him. He had used arachis oil combined with beeswax in the proportion 2, 2·5, 3·2, and 3·5%, and also ethyl oleate with 4, 5, 6, and 7% of beeswax. In general these suspensions had been made up with 50,000 units of penicillin per c.cm. With ethyl oleate and 5% wax, 75,000–100,000 units per c.cm. had been used. There was no significant difference in the proportions of penicillin found in the body fluids after injections with these various mixtures. With arachis oil 3½% beeswax was rather better than 2½%, and with ethyl oleate 6% beeswax was slightly superior to the other proportions. After an injection of 300,000 units of penicillin there was much individual variation in the time that a therapeutic level was maintained in the blood; but whereas maintenance for twelve to sixteen hours was usual it seldom persisted for twenty-four hours. Penicillin was found in urine forty-eight to ninety-six hours after injection, depending on the sensitivity of the test used. In general the hold-up of penicillin persisted longer after subcutaneous than after intramuscular injections. The procedure had been to give a single daily injection of 300,000 units for eight days; but it was proposed to treat a series of cases with two daily injections each of 300,000 units for five days. Pure penicillin was shortly to become available and it should be possible to concentrate this in these mixtures to 100,000 units per c.cm.

Reviews of Books

Diagnosis of Nervous Diseases

(9th ed.) Sir JAMES PURVES-STEWART, K.C.M.G., C.B., M.D. Edin., F.R.C.P., consulting physician to Westminster Hospital. London: Edward Arnold. Pp. 880. 40*s*.

IT is pleasant to welcome the ninth edition of a book which has become an old friend. It is now 40 years since the first edition was published, and books, like their readers, are apt to exhibit a middle-age spread. This one now has 880 closely packed pages and is consequently heavier and—even allowing for higher cost of production—more expensive than it used to be. A more important and regrettable consequence of the addition of new material and the detailed treatment of the whole is that few readers will find it possible, as once it was, to read it through; and it is bound to be regarded mainly as a work of reference, which lessens its educational value. As such, however, it is very complete and up to date. A small but important detail needs correction. The fifth lumbar and first sacral dermatomes are shown correctly in fig. 35 but incorrectly in fig. 37 and plate I.

Battling Surgeon

CHARLES BROOK, M.A. Camb., M.B.C.S. Glasgow: Strickland Press. Pp. 176. 2*s*. 6*d*.

THOMAS WAKLEY, Member of Parliament, coroner for Finsbury, founder of THE LANCET, reformer and wit, is a character to stir the interest of any biographer. Unfortunately for Dr. Brook, his story has already been told accurately, thoroughly, and well by Sir Squire Sprigge, successor at fourth remove to the editorial chair, in his *Life and Times of Thomas Wakley*. In *Battling Surgeon* Dr. Brook nowhere mentions his debt to this work, though in some places he has been content with the merest paraphrase—almost a transcription—of Sprigge's words. There is indeed very little new material in his book, and he has been misinformed about the pronunciation of Wakley's name; he has put his error on record as the correct version, though he should have been stimulated to look further by the verse which he quotes from *Punch*, in which "Wakley" is rhymed with "slackly." In some respects, however, he has done justice to his subject, and it is interesting to compare the difference in outlook of the two biographers. Where Sprigge is apt to subdue the colours and damp down the fires of Wakley's more flamboyant actions, Dr. Brook glories in their unorthodoxy. Yet it may be doubted whether after all he has as true a concept as Sprigge of Wakley's real quality. The man who carried so many reforms was not concerned merely to dazzle supporters, or to thump and override opponents. He did nothing without a purpose, and he was no man's tool, whether consciously or unconsciously. When he describes Wakley as "a willing stooge" to William Lawrence and James Wardrop, Dr. Brook betrays misunderstanding.

Clinical Case-taking

(3rd ed.) GEORGE R. HERRMANN, M.D., PH.D., professor of medicine, University of Texas. London: Kimpton. Pp. 192. 9*s*.

FIRST published in 1927, this little book is essentially practical and is intended as a guide for the student at the bedside. The new edition is described as a "complete revamping and expansion of the previous two editions." The introduction is a striking apologia for the clinical approach to medicine, particularly impressive in coming from what is often regarded as the home of laboratory medicine. There is a tendency today to minimise the importance of the patient's history, but Dr. Herrmann emphasises again and again the necessity for a full and complete history in every case. The modern clerk or dresser in this country may rub his eyes on reading that "a complete history, a detailed physical examination, and the routine laboratory work on each assigned case must be completed before the 'senior rounds' at eight o'clock on the second morning after the day of admission, that is, always within forty-eight hours, irrespective of Sundays or holidays." It is surprising to find more space devoted to mental and nervous diseases than to diseases of the lungs, the heart, the digestive tract, and the genito-urinary tract combined. But the only real complaint is of the price, which, even allowing for war-time conditions, seems unduly high.

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THE LANCET

LONDON : SATURDAY, FEBRUARY 23, 1946

The Doctor's Place

HOSPITAL employees now have a trade-union, and this has produced a statement[1] which deserves particular notice because it illustrates a rather dangerous trend of non-medical thought. The present system is described as wasteful of "trained personnel":

> Medical superintendents, the union remarks, have been known to complain of "waste of time in administrative functions, which time could be far better utilised in the full exercise of his medical skill and knowledge in the interest of the patients or in medical research. Again, it is fatuous to talk about the 'shortage' of trained nurses when so many today are not using their nursing skill and wasting their experience as nurses in purely administrative positions. In both instances many comments have been expressed by medical superintendents and trained nurses of getting 'rusty' and 'out-of-date' for the reason that their administrative functions prevent them from fully applying and developing their professional skill. Instead of stopping this leakage, we venture to suggest that since 1930 the number of professional medical men and trained nurses, who have been elevated [*sic*] to purely administrative positions, has grown beyond reasonable proportions. . . . In the main, the duties they carry out could be undertaken by laymen, and possibly with greater advantage."

The remedy suggested is that each hospital should be a unit under the jurisdiction of a hospital governor or controller, who should be "a layman and NOT a medical man" and be responsible directly to the hospital committee. Under him, and responsible to him, would be a medical superintendent in charge of the medical services, a matron in charge of the training and well-being of the nurses, a steward in charge of supplies and domestic staffs, a clerk-of-works in charge of buildings and of works staff, and an engineer in charge of plant and engineering staff—all ranking as independent equals.

> And "having regard to the development in recent years of the powers and functions of the 'Medical Officer of Health,' the suggestion [is] to be considered that his future designation should be 'Director of Public Health Services' and that non-medical men, where qualified, should be eligible for this position, thus releasing more medical men for following medicine."

Lay control will presumably overcome the deficiencies inherent in medical and nursing control:

> "Up to the present the Minister of Health has mainly consulted the medical profession, who cannot be blamed for trying to bolster up their claims for ascendancy. He has also consulted the nursing profession. Both these professional aspects have, since 1930, had full play in the development of the hospital services with no satisfactory results. The time has arrived, in our submission, when the dogmatic control by the medical and nursing profession of the hospital services must be challenged. These services are for the public. Administration should be in the hands of a *layman as representing the public*. Let the doctors and nurses give the whole of their time in directing medical and nursing treatment."

All this is no doubt highly convincing to those to whom it is addressed. But the conclusions seem to be based on a preliminary misconception of the facts. To suggest that hospital services have not improved during the past fifteen years is unjustifiable: actually the improvements have been striking, despite the economic blizzard of the early '30's and the distracting years of war. The modern municipal hospital is a long way from the old poor-law infirmary with its lay master (whose restoration under another name is now so enthusiastically sought), and much of the advance is attributable to medical inspiration and guidance. To put down all the shortcomings, quite simply, to the doctor and the nurse—to "medical control"—may be good propaganda but is little else. Medical control, so far as it exists, is strictly limited. In the most favourable circumstances the county or town clerk and the treasurer have equal authority with the medical officer of health, as well as other competing obligations; hospital committees are not the masters of finance committees, and all are subordinate to the council as a whole.

As things now stand or are likely to stand in the near future, we should say that the public has far less to fear from medical control than from the control of medicine. In concentrating, reasonably enough, on the need to make hospital work attractive to non-professional employees, the union tends to ignore the even greater need to attract outstanding ability into the medical and nursing professions. If in a revised world medicine is to lose its opportunities of gaining large material rewards, it would be madness at the same time to reduce its professional status and scope. Like other professions, it can never be too rich in men of first-class ability, and these proposals of the Hospitals and Welfare Services Union are scarcely calculated to induce a greater flow of the best material into our schools. What matters most to the young doctor, apart from a livelihood, is the prospect of responsibility for his own work—freedom to serve the patient, and serve science, without interference: most medical men, as the union says, are not interested in administration, which is increasingly regarded as a specialty of its own. Nevertheless in a medical service there must be much administration for which a medical background would at least be helpful; and to say that nobody who is a qualified doctor or nurse should undertake such work is neither sensible nor just. Schoolmasters may become headmasters with entirely administrative functions; dons may become heads of colleges and universities; bishops, whose first qualification is a knowledge of theology, may administer great dioceses; chemists, engineers, and architects may become the successful heads of great businesses with hundreds of employees; lawyers may regard the world as their oyster; but it seems that the doctor and nurse, like cobblers, must stick to their last. Technical knowledge of mankind and its ills turns them into the guide and friend of individual men, women, and children, but completely unfits them to control any aggregation of humanity as a working unit. "Elevation" to an administrative post is beyond the competence of the conditioned reflexes which are apparently all that their work allows or produces. So back to their ward they must go, and there they must stay.

Some would ask no different fate: to most doctors the bedside is the most interesting and important place in medicine. But all will want to be sure about doing their work there under favourable professional conditions. In these columns and elsewhere in the

1. The Hospital Services. Statement by the Hospitals and Welfare Services Union, 38, Argyle Square, London, W.C.1.

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last few years there has been great discussion about the merits and demerits of the medical superintendent, and opinions still differ widely; but on one thing most of us agree—the hierarchical system must go. It may or may not be useful to have a medical man as facilitator and coördinator, but he must never infringe on the clinical responsibility of the senior staff for their own patients: in other words, though the medical superintendent is an administrator, his colleagues should be in no way subordinate to him. And if this is true of a medical superintendent, how much more does it apply to a lay superintendent. Where the hospital administrator is a layman, he should resemble the house-governor of a voluntary hospital rather than the controller depicted by the Hospitals and Welfare Services Union.

This question of lay control is far from easy. As we have repeatedly pointed out, the hospitals and other equipment of the medical services do not belong to the medical profession, and doctors have no divine right to direct their use. Having profited by much political education lately, few of us would dispute the ultimate supremacy of the elected representatives of the public, whether at the parliamentary, local-government, or hospital-committee level. That is quite a different thing, however, from accepting the right of these public authorities to appoint a layman to take charge of doctors and their work—a suggestion which the profession would unitedly resist. The danger unfortunately does not stop with the risk of medical subservience to a hospital governor. The press has lately carried plausible forecasts of the nationalisation of hospitals, and of their administration through regional boards, and we cannot help remembering that in the Civil Service the technical expert is always subordinate to the lay administrator—a principle not altered by recent improvement of the expert's standing. Even those of us who are most anxious for the Government's vast operation to be successful cannot be blind to its risks, the chief of which is that bureaucratic methods may depress the spirit of enterprise, and eventually the intellectual level, of the medical profession. We publish this week one of the many letters we have received from doctors who want to make the new service work but are genuinely scared lest regulation should bring degeneration.

The fear in all our minds has been perfectly summed up in the phrase "utility medicine"; which is what we should ultimately get from the proposals of the Hospitals and Welfare Services Union, or from conventional Civil Service procedure. There is, however, no necessity to be bound by either. The elected representatives of the public are to some extent the master of our fate; but we firmly intend, for everybody's sake, to remain captain of our soul.

Diet and Liver Injury

IN the past investigations into the pathogenesis of portal cirrhosis and acute yellow atrophy have concentrated mainly on the search for a toxic agent, without much success. Such efforts seem to have been largely misdirected, for recent work indicates that the lesions are due not to the presence of some noxious factor but to the absence of substances necessary for normal metabolism. By means of deficient diets both necrotic and cirrhotic lesions of the liver, similar to those in man, have now been produced experimentally.

The influence of diet in mitigating or exaggerating the hepatic necroses produced by certain well-recognised poisons has been known since 1914, when OPIE and ALFORD [1] demonstrated in dogs that carbohydrate diets reduce, while fat diets increase, the susceptibility of the liver to the toxic action of chloroform. This line of work has steadily developed, and WHIPPLE and his school [2] have now shown that protein depletion enhances this susceptibility, while repletion, particularly with the sulphur-containing amino-acids, restores it to normal. The first evidence that dietary deficiency alone can produce hepatic lesions was provided by WEICHSELBAUM [3] in 1935, when he showed that rats on a low-casein diet developed "hæmorrhages" into the liver. Later, in the course of experiments designed to produce fibrosis of the liver, similar lesions were obtained by GYÖRGI and GOLDBLATT,[4] who recognised that they were in fact necroses. These results were soon confirmed, although they could not constantly be reproduced. But there was no agreement regarding the dietary factor responsible for their causation, and most workers looked on the necrosis as but a transient stage in the sequence to a more readily reproducible dietary lesion—"cirrhosis" of the liver. HIMSWORTH and GLYNN [5] then claimed that two distinct lesions could be produced by diet—one a massive hepatic necrosis (acute yellow atrophy) with its sequel nodular hyperplasia; the other a diffuse hepatic fibrosis resembling portal cirrhosis. According to them, this necrosis could be produced regularly by diets deficient only in protein, its occurrence could be related to the amount of sulphur-containing amino-acids in the diet, and methionine afforded protection against it. It has now been learnt that, unknown to the British and American workers, HOCK and FINK [6] in Germany had observed the same correlation between the development of necrosis and the intake of sulphur-containing amino-acids and had found, further, that cystine conferred protection. As the latest step in elucidating the causation of dietary necrosis, GLYNN, HIMSWORTH, and NEUBERGER [7] have now provided satisfactory evidence that experimental dietetic cirrhosis is due to lack of cystine. By establishing experimental dietetic necrosis as a deficiency disease, this new work will compel us to reorientate our views on the causation of several hepatic lesions. By providing morbid anatomists with a sequence of easily reproducible lesions it should enable them to distinguish fibrosis following necrosis from fibrosis arising in other ways. And it suggests a fruitful line of investigation into the causation of the "toxic jaundice" and "cirrhosis of the liver" which are so prevalent among races subsisting on diets grossly deficient in protein.

The relationship between acute yellow atrophy and its sequelæ in man and experimental dietetic necrosis is not established. Deficient diets may, as has been suggested,[8 9] be the direct cause of the lesion in some tropical cases; but obviously an uncomplicated dietary deficiency can only rarely, if ever, be

1. Opie, E. L., Alford, L. B. *J. Amer. med. Ass.* 1914, **62**, 895.
2. Whipple, G. H. *Amer. J. med. Sci.* 1940, **199**, 216. Miller, L. L., Whipple, G. H. *J. exp. Med.* 1942, **76**, 421.
3. Weichselbaum, T. E. *Quart. J. exp. Physiol.* 1935, **25**, 363.
4. Györgi, P., Goldblatt, H. *J. exp. Med.* 1939, **70**, 185.
5. Himsworth, H. P., Glynn, L. E. *Clin. Sci.* 1944, **5**, 93, 133.
6. Hock, A., Fink H. *Hoppe-Seyl. Z.* 1943, **279**, 187.
7. Glynn, L. E., Himsworth, H. P., Neuberger, A. *Brit. J. exp. Path.* 1945, **26**, 326.
8. Himsworth, H. P., Glynn, L. E. *Lancet*, 1944, **i**, 457.
9. Himsworth, H. P. *Proc. R. Soc. Med.* 1945, **38**, 101.

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its cause in this country. Here acute yellow atrophy most often occurs as a terminal event to an illness which normally gives rise only to transient liver damage. HIMSWORTH and GLYNN [8] attempt to resolve this difficulty by suggesting that in such cases the deficiency arises as a secondary result of the primary condition. They point out how it occurs in illnesses in which anorexia and vomiting are prominent features, that it is relatively common during pregnancy when the fœtus is draining nutriment from the mother, that several of the poisons which notoriously produce the lesion are known to combine with the sulphur-containing amino-acids, and that the mortality from conditions such as yellow-fever-vaccine jaundice is higher among poorly nourished than well-fed populations. Although these are as yet only suggestions, their clinical implication is evident, and in this connexion the recent work of MCCALLUM and MILES [10] is significant. They injected material from human cases of infective hepatitis into rats which were receiving a diet deficient in protein but not so deficient as to produce dietetic necrosis. After several passages they produced fatal hepatic necrosis in the animals which, before the injection, had been taking the deficient diet, whereas they were unable to produce necrosis in animals which had not previously been so depleted or were taking higher protein diets. Thus our knowledge of lesions of the liver characterised by or arising from frank necrosis is developing satisfactorily. There is good evidence that experimental dietetic necrosis depends on deficiency of the sulphur-containing amino-acids; and there are suggestive clues that a similar factor may play its part in producing comparable conditions in man.

The situation in regard to portal cirrhosis is, however, somewhat confused, largely because of the loose way in which that term has been used. To some workers it implies little more than fibrosis of the liver, irrespective of its type or evolution. Others use it in the strict sense to mean a condition characterised by the insidious development of a uniformly distributed fibrosis which first circumscribes and then invades and divides the hepatic lobules. It is in the second sense that it is used in human pathology,[11 12] and it is this pathological condition which corresponds to the clinical state known as "alcoholic" or Laennec's cirrhosis. If we accept this strict definition many of the so-called experimental hepatic cirrhoses must be excluded. These are probably examples of postnecrotic scarring, which in its final stages though not throughout its evolution closely resembles portal cirrhosis. When these are excluded we are left with a group of experimental fibroses of the liver [5 13] which are undoubted examples of portal cirrhosis judged from their pathology and their development. These have been produced by several different types of diet, but the effective diets have one feature in common—they all produce a severe and protracted fatty infiltration of the liver. This observation is of particular interest clinically because such an infiltration has been emphasised as a necessary antecedent to human portal cirrhosis by TROUSSEAU,[14] CONNOR,[12] and more recently by GILLMAN and his colleagues,[15] who by liver biopsies have followed the evolution of a cirrhotic condition from the stage of fatty infiltration. There are many ways of producing fatty infiltration of the liver. Experimentally the most convenient is to give a diet rich in fat. But it can equally well be produced by a diet poor in those "lipotropic" factors which normally prevent the accumulation of fat in the liver; and this latter line seems the more profitable to pursue in seeking to correlate human dietaries with the development of portal cirrhosis.

10. McCallum, F. O., Miles, J. A. R. *Lancet*, 1945, 1, 3.
11. Mallory, F. B. *Bull. Johns Hopk. Hosp.* 1911, **22**, 69.
12. Connor, C. L. *J. Amer. med. Ass.* 1937, **112**, 387.
13. Rich, A. R., Hamilton, J. D. *Bull. Johns Hopk. Hosp.* 1940, **66**, 185. Spellberg, M. A., Keeton, R. W. *Amer. J. med. Sci.* 1940, **200**, 668. Blumberg, H., Grady, H. G. *Arch. Path.* 1942, **34**, 1035. Chaikoff, I. L., Eichorn, K. B., Connor, C. L., Entenman, C. *Amer. J. Path.* 1943, **19**, 9.
14. Trousseau, A. Lectures on Clinical Medicine. New Sydenham Society, London, 1870, vol. iii, p. 421.
15. Gillman, J., Gillman, T. *Arch. Path.* 1945, **40**, 239.

Mental-health Service of the Future

THE progress of our organised medical services has been marked, in the last hundred years, by some comprehensive reports, often semi-official, which have helped to mould subsequent legislation. A notable document of this kind, just published, is summarised in this issue. Dr. C. P. BLACKER, entrusted in 1942 with the war-time task of surveying the psychiatric outpatient services of the country, turned what might have been a depressing ascertainment of deficiencies and small advances into a temperate analysis of the unequal findings, and a broadly conceived plan for making our mental-health services as good as the state of psychiatric knowledge allows and the height of our aims for the wellbeing of the community would demand. Encouraged in this general purpose by the chief medical officer of the Ministry of Health, he examined the wide disparities between the mental-health services of different regions and concluded that not only the kind but the scale of the future provision in this regard must be assessed in the light of the facts brought out by his survey. The most valuable section of the report[16] is therefore the lengthy chapter containing detailed proposals for setting up a service that will promote the mental health of a population of about a million. Whatever the structure of the future health services may be, this unit—the region with a population of a million—will afford a standard of comparison, and Dr. BLACKER'S scheme will be applicable without serious modification.

The report grasps many nettles—the relation of the mental hospitals to the outpatient services, of psychiatry to the rest of medicine, of child-guidance centres to child psychiatric clinics. But, although the firm hand that does this grasping is clearly that of an individual, no trace of partisanship is evident in the judicious exposition. Sir WILSON JAMESON in his foreword points out that the report, while dealing with work sponsored by the Ministry of Health, expresses the personal views of its author, without official comment or censorship, but that "the reactions it evokes will be taken into account in the framing of future policies." There can be little doubt that the reactions will be such as to make it desirable that these balanced views and recommendations of Dr. BLACKER'S, arrived at after full consideration of the outlook of professional bodies, should be accepted as the basis for an active official policy.

16. Blacker, C. P. Neurosis and the Mental Health Services. London: Oxford University Press. Pp. 218. 21s.

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the subject of "planning" and its implications respect of central control, Dr. BLACKER has some tinent comments which hold good for much besides psychiatric services.

The report testifies at every point to the wide pe of a good mental-health service, no longer olly concentrated in mental hospitals and in out- ient clinics. It will have to concern itself with eption centres, hostels for difficult and unstable ldren, and the community care of the mentally normal; it must seek to reduce the size of the ocial problem group" and treat the delinquent mbers; and there will be need for constant liaison ween the psychiatrists on the one hand and the er doctors, the teachers, the psychologists and ial workers, the voluntary organisations, the ents, and the community. Nowhere is it more in than in psychiatry that medicine has social igations and has the right to demand social help performing them. Dr. BLACKER'S proposals on s head demonstrate that sense and practical ggestions about ways and means are compatible h a vigorous endorsement of the aim of "social dicine." With its array of facts and its well- it plan, this report offers the argument and the ans for promoting the mental-health services their full range of opportunity. No doubt the thcoming Health Act will take these services into ount. It will be for those who administer the to make adequate use of the conciliatory judgment d sound grasp of essentials which have so plainly ne to the composition of Dr. BLACKER'S report.

Annotations

LONDON'S HOSPITALS

THE report presented to the London County Council s week by its hospitals committee makes stimulating ding; it includes long-range plans which will be ially applicable under the present control or in a rdinated national hospital system; and its recom- ndations may be taken as some guide to general future velopments. The first task is, of course, to repair r damage, at a cost of about £2,600,000: altogether, ne 5000 beds have been put out of commission by ect damage, and a good many more by indirect effects bombing. The committee is satisfied that the pre- r total of beds is approximately enough for London's eds, though, as in the Tooting and Crystal Palace as, there are local shortages which are to be rectified new building. Far-sighted plans are advanced to rease the individuality of hospitals and to diminish institutional atmosphere: medical, nursing, and mestic staff committees are to be encouraged at each spital; greater attention is to be paid to the provision bright and cheerful surroundings by suitable decora- n of wards and by improving hospital gardens; and standard of dietaries is to be raised (catering officers about to be appointed to three hospitals). Patients l gain privacy by the provision of a curtain which can drawn round each bed. Rest-rooms for relatives the dangerously ill are to be supplied, and canteen ilities are to be improved. The appointment system, ich has proved a success in experimental use, is to be nerally adopted for outpatients, and outpatient depart- nts are to be added to a further 20 general hospitals.

The committee foresees the division of London, for spital purposes, into about 21 districts, each with main hospital, of 400–1000 beds, which would closely linked to other hospitals in the neigh- bourhood. Eleven of these district hospitals would be controlled by the L.C.C., while the remainder would be voluntary institutions. It envisages, too, the development of special units (as for chest and plastic surgery), which would be placed at convenient central sites. One excellent suggestion is for the provision of night sanatoria to enable tuberculous patients who have completed sanatorium treatment to resume their normal work while continuing to sleep and eat under the best conditions and with a modicum of supervision. Two reablement centres are to be established.

While the general trend is towards decentralisation and increased authority for the hospital committee, the superintendent is to be relieved of some responsibility, particularly for the clinical care of patients, which is to be assumed by consultants and specialists. The establishments of technical and administrative staffs (including chiropodists and almoners) are to be increased; doctors above the status of house-officer, and most nurses, including possibly student nurses, may exercise the option to live outside the hospital. This concession, in conjunction with the Rushcliffe scale of salaries, the most recent increases under which the council has adopted this month, should help greatly to relieve the present deficiency of 3000 nurses in the area.

The committee would welcome an immediate extension of the existing system of undergraduate teaching in L.C.C. hospitals. It does not discount the possibility of establishing its own medical, and possibly dental, schools at a more remote date.

SULPHONAMIDE PROPHYLAXIS OF RESPIRATORY INFECTIONS

THE favourable reports from America on the prophylactic use of sulphonamides in rheumatic fever, reviewed in this journal in December,[1] make one wonder whether acute infections of the respiratory tract could be prevented in the same way. This has, in fact, been tried by Siegel[2] in New York children, and in adults by the United States Navy[3] in 1943–44. In the naval experiment with 500,000 men (half acting as controls) the results were strikingly favourable. Admission to hospital for severe respiratory disease was reduced by 80–90%, streptococcal infections were lowered by 85%, and pneumococcal by 50%, and meningococcal meningitis almost disappeared. Virus infections were not definitely affected. A daily dose of sulphadiazine, 1 g., seemed most satisfactory. Mild drug reactions were encountered in 3–6 men per 1000, but severe reactions were very rare. The New York trial was carried out on 64 physically normal but feeble-minded boys and girls living in overcrowded quarters, and comparable controls were observed for each patient receiving treatment. Sulphadiazine, 0·5–2 g. daily, was administered to children in the treated group for periods ranging from one to three months between August, 1942, and April, 1944. The incidence of acute illness in the observation period was remarkably alike in the treated and control groups. The course of the illnesses, however, seemed to be somewhat modified in the children receiving the drug, the acute febrile stage being somewhat shorter. There were no serious toxic effects when the drug was given for these comparatively short periods. The conditions prevailing during the trial were unusual, in that there were no outbreaks of severe infections of the respiratory tract such as had occurred in previous years.

A detailed study[4] of the flora of the throat under the influence of sulphadiazine in the New York children showed that the immediate effect of the drug was the

1. Barclay, P. E., King-Lewis, F. L. *Lancet*, 1945, ii, 751.
2. Siegel, M. *Amer. J. Dis. Child.* 1943, 66, 114; 1944, 67, 365; 1945, 70, 89.
3. Thomas, C. B. *J. Amer. med. Ass.* 1944, 120, 490.
4. Siegel, M., Julianelle, L. A. *Ann. intern. Med.* 1945, 22, 1, 10, 21, 29. Siegel, M., Karr, H. V., Julianelle, L. A. *Amer. J. Hyg.* 1945, 41, 228; 42, 214. Siegel, M. *J. Amer. med. Ass.* 1942, 119, 783.

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almost complete disappearance of the neisseria; later these reappeared and regained their former prevalence, having in the interval acquired a resistance to the drug. Any change in the number or distribution of the hæmolytic streptococci was no more than suggestive. From unknown sources during the experiment at least one, and probably more, strains of *C. diphtheriæ* were introduced into the community and spread with equal facility among treated children and controls. All these strains were drug-resistant from the beginning and appeared to be avirulent. It is the pneumococci that provide the most interesting story. Shortly after the beginning of treatment there was a striking rearrangement of the prevalent types, determined by differences in their ability to adapt themselves to the inimical influence of the drug and become "drug-fast." Two types, XI and XVIII, assumed prominence among the treated group. Drug-sensitive organisms of both types had been found early in the experiment in the untreated group but within a short time these had been replaced by drug-fast strains, although these never became as prevalent as they were in the treated group, where between them they made up 87% of the pneumococcal flora. Both types were of low virulence, but it was found that the virulence of more invasive types was not lost in the process of acquiring drug-resistance. Possibly it was fortunate that none of these virulent types became widely prevalent. With one doubtful exception, no severe pneumococcal infection occurred in either group. After 15 weeks treatment ceased and the distribution of types tended to revert to what it was at the beginning of the experiment. Finally types XI and XVIII were not seen except in a few chronic carriers, but their drug-resistance remained unimpaired 18 months after treatment had begun. One more phenomenon observed may have wider implications. The throat flora of both groups after treatment had stopped was subject to a series of subclinical epidemics of pneumococci of one type or another at intervals of 2–4 months. None caused symptoms, but up to 97% of the exposed population was involved.

These observations present more questions than answers. Campbell [5] has suggested with reason that the indifferent response to treatment of gonorrhœa contracted in Italy may be due to the development of strains of gonococcus resistant to the sulphonamides. The possibility of the epidemic spread of a strain of pneumococcus or streptococcus which is both virulent and drug-resistant is not to be regarded lightly, especially if it occurred in conjunction with epidemic influenza. From a wider aspect the only parallel to these well-conceived experiments seems to be in the differential effects of weed-killers and such gross physical disasters as fire on the ecological balance of the higher plants.

INCREASED TOLERANCE TO HYPOXIA

ALTITUDE anoxia being the main physiological obstacle to high flying, any method, immediately practicable or otherwise, of increasing tolerance to oxygen lack may have its applications in aviation medicine. It is well known that those who live on mountains become acclimatised to the low partial pressure of oxygen by developing polycythæmia, and the experiments of Pace, Consolazio, and Lozner,[6] suggest that polycythæmia produced by blood-transfusion has a similar effect. Their controlled experiments were carried out on healthy men. The subjects were transfused with 2 litres of a 50% suspension of fresh red blood corpuscles in dextrose saline, and a study was made of their reaction and that of the controls, over a period of two months, to breathing air in a low-pressure chamber simulating an altitude of 15,000 ft. Those who had been transfused had an arterial oxygen capacity and content that was significantly higher than the control group, both at sea level and at altitude. Their tolerance to hypoxia fell slowly, and the oxygen capacity and content of the arterial blood did not approach normal for almost a month. Hæmatologists will be interested in the evidence the experiment supplied regarding the life and functional capacity of the transfused cells. The transfusion method, which had no untoward sequelæ in this trial, may be useful when a raised tolerance to hypoxia has to be induced quickly.

5. Campbell, D. J. *Brit. med. J.* 1944, ii, 44.
6. Pace, N., Consolazio, W. V., Lozner, E. L. *Science*, 1945, **102**, 589.

CHILDREN IN APPROVED SCHOOLS

"WHO approves of approved schools?" asked the intelligent inquirer. "Surely not the inmates?" It seems he must be wrong, for in a review [1] just published of the aims, methods, and achievements of these schools in England and Wales, Mr. M. M. Simmons, one of the inspectors of the children's branch of the Home Office, points out that in most of the schools the child has only to walk out if he wishes to get away. Locks and bars have been discarded; and though some children do walk out, by far the greater number stay. What keeps them? The answer is partly given by a case reported in the *Times* of Jan. 22. A boy who had stolen 2*s*. 1*d*. from his mother's gas-meter explained to the magistrate that he wanted to be sent to an approved school because his brother, who was already in one, had told him of the nice things they did.

Mr. Simmons's review bears out this juvenile offender's estimate, at least as far as the boys are concerned; the pursuits offered to girls seem to be less interesting, centring largely round domestic training. The boys learn many crafts—all indeed which are needed to maintain the school buildings and equipment. They learn to build and plumb, to lay drains, to farm, carpenter, and cabinet-make; and they are taught by men who understand these crafts thoroughly and are capable of teaching. They also have ordinary school lessons up to the age of 14 or over, depending on their needs and on the practice of the school; for the schools are by no means uniform. They grew up first as voluntary enterprises, as the industrial schools and reformatories of the nineteenth century. How far we have progressed in our conception of what the delinquent needs is evident from some of the illustrations in this booklet. The inmates of a girls' reformatory at the beginning of this century, dressed like pantomime housemaids, with hair strained back, sit in rows on backless benches, not a smile among them, while a text on the wall directs them to: "Learn of Me for I am Meek and Lowly in Heart." Four boys, in dowdy serviceable uniforms with convicts' caps, stand at attention before the camera, and an industrial school like a barracks looks drably out on an empty street. The rest of the pictures are very different; they show the approved schools of our day—old farmhouses, generous Georgian family homes, or new buildings put up by the boys; inside them are airy workshops, pleasant dining-rooms, a gymnasium with full equipment (all in hard use), and a good stage for acting. Other pictures show boys engineering, boys ploughing, boys milking cows, girls folk-dancing, boys preparing cold frames, boys swimming, boxing, haymaking, rowing, girls playing netball, boys playing football, boys painting pictures, making pots, working a puppet theatre, girls growing vegetables; and one fortunate girl feeding lambs. Not all the schools offer all these activities; some are large with much equipment, some are small depending partly on the ingenuity and skill of the children and their teachers to equip themselves. The expenses are shared between the local authorities and the Treasury; and there are at present 145 schools, with 9207 boys and 2105 girls in them—an increase

1. Making Citizens. H.M. Stationery Office. 1945. Pp. 62. 1*s*

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since 1938, reflecting the increase of delinquency brought about by the war, of 41 schools and of 2548 children. Of these 145 schools, 34 are owned and managed by local authorities and 111 are still the responsibility of voluntary managers.

One headmaster, asked why the children stayed, replied "Food"; and it is a fact that many of them on admission are undernourished and in poor health. One important task of the school is to get them fit by feeding them properly, and giving them enough sleep and enough healthy exercise. Infestations and chronic infections have to be cleared up, and all children are immunised against diphtheria. At some girls' schools there are clinics for the treatment of venereal disease. In all, the school doctor visits once a week, and examines children on admission and once a quarter afterwards. Correction of a disfigurement often restores the self-respect of the child affected. Other changes are brought about by the community spirit in the schools, the personal interest which some children now experience for the first time, and the opportunity to do the sorts of things that children like to do. When choosing an approved school for a given child the courts usually seek the advice of the children's branch of the Home Office, but sometimes one or two trials have to be made before the right school is found, and this is unsettling for the child. The Home Office is overcoming this difficulty by establishing classifying schools, staffed by educational psychologists and teachers able to assess ability, temperament, and character, where a child can stay for 1–3 months before being sent to the appropriate approved school.

The review explains why the work of the approved schools is successful in the great majority of cases—nearly three-quarters of the children never get into any further trouble. It does not explain why the residue are failures, or speculate on the ways in which their numbers might be reduced, but a hint may be picked up from these informative pages. Like so many important enterprises today the approved schools are understaffed; and they need staff of a specially keen and devoted type. Young people interested in psychology and social work might do well to consider training as teachers for these schools.

PALUDRINE IN THE FIELD

REPORTS are now coming in on the fuller field-trial of 'Paludrine,' the synthetic antimalarial drug evolved by Imperial Chemical Industries.[1] Brigadier Hamilton Fairley and his colleagues at the Australian Army Medical Research Institute at Cairns in Queensland have examined the effect of paludrine on mosquito-conveyed strains of *Plasmodium vivax*, *P. falciparum*, and *P. malariæ* from the standpoint of its action as a clinical suppressive, as a true causal prophylactic, as a therapeutic agent, and as a gametocidal agent. They have tried to determine its mode of action, more particularly its activity on the presumptive exo-erythrocytic stages of the parasites, and have sought for toxic manifestations. Their work was done on volunteers from the Australian Forces who had not served in endemic malarial areas, using strains of parasites obtained from New Guinea and transmitted by experimentally infected *Anopheles punctulatus* var *punctulatus*.

The preliminary investigations in Australia fully confirm the earlier studies made in the British Isles, and also indicate that paludrine in small daily dosage is an effective clinical suppressive and a true causal prophylactic in malignant tertian malaria. It is an equally effective clinical suppressive in benign tertian malaria, but it does not invariably afford effective causal prophylaxis against this infection, which subsequently developed in at least a proportion of cases receiving fairly substantial daily doses of the drug for 3 weeks after the last bites of the infecting mosquitoes. An interesting observation made in the Australian experiments was that the inoculation of 200 c.cm. of blood from cases of benign tertian malaria, known to be infected because they subsequently relapsed, failed to infect volunteers while the donors were taking paludrine. In similar circumstances quinine or mepacrine does not prevent infection, which suggests that paludrine on the one hand and quinine and mepacrine on the other act on different forms of the parasites. With paludrine it is the exo-erythrocytic forms of the parasite in man that are presumably destroyed, as they certainly are in birds.

The efficacy of paludrine in the clinical cure of attacks of benign tertian, malignant tertian, and quartan malaria was confirmed. In malignant tertian malaria radical cure of the infection usually followed a 10-day course of therapeutic treatment. As a direct gametocide paludrine has little action, the production of gametocytes of either *P. vivax* or *P. falciparum* and their numbers and morphology in the peripheral blood not being materially altered by the drug. The gametocytes, however, did not mature when ingested by mosquitoes while the patient was on the drug; but a week after cessation of the drug the circulating gametocytes would once more infect mosquitoes. Furthermore, mosquitoes given a partial blood meal on a patient taking paludrine, and then allowed to complete their meal on a gametocyte-carrying case not on the drug, did not become infected, suggesting that paludrine acts on the early developmental stages of the malaria parasites in the mosquito. This action on the developmental forms in the mosquito was not exerted when the mosquito had been infected some days before the blood meal on a patient receiving the drug.

Fairley and his collaborators have studied the effect of single doses of paludrine, both as a prophylactic and as a therapeutic agent in malignant tertian and benign tertian infections. Their work suggests that a single small dose of paludrine weekly, given for an indefinite period after therapeutic control of the primary attack, will prevent relapse of the more resistant benign tertian malaria until its eradication is ultimately achieved. They have also re-examined the toxicity of the drug, which has been found to be negligible within the wide therapeutically effective range of dosage. They confirm the statements already made on the merits of this compound compared with the older remedies.

1. See *Ann. trop. Med. Parasit.* December, 1945. *Lancet*, 1945, ii, 639.

On Active Service

AWARDS

M.C.

Captain K. W. BEETHAM, M.B. Edin., R.A.M.C.
Captain B. L. P. BROSSEAU, R.C.A.M.C.
Captain W. M. BYERS, R.C.A.M.C.
Captain L. S. COOPER, M.D. Jefferson, R.A.M.C.
Lieutenant W. J. GALLAGHER, M.B. N.U.I., R.A.M.C.
Captain J. H. HALDANE, L.R.C.P.E., R.A.M.C.
Captain H. M. KERSHAW, M.B. Leeds, R.A.M.C.
Captain G. H. MCPHERSON, M.B. Edin., R.A.M.C.
Captain H. E. S. MARSHALL, L.R.C.P., R.A.M.C.
Captain J. G. MOTT, M.B. L'pool, R.A.M.C.
Major J. C. WATTS, M.B. Lond., R.A.M.C.
Captain C. T. H. WHITESIDE, L.R.C.P., R.A.M.C.
Captain W. J. W. WOLFE, M.B. Dubl., R.A.M.C.

KING'S COMMENDATION FOR BRAVE CONDUCT

Major G. C. K. REID, M.B. St. And., R.A.M.C.

The American Bronze Star medal has been awarded to Major W. R. HENDERSON, R.A.M.C., for saving American lives while working in German hospitals from 1940 to 1945.

Major Henderson, who before the war was lecturer in neurological surgery in the University of Leeds, formed and equipped the first neurosurgical unit of the British Army, which he took to France in May, 1940. He remained behind at Dunkirk to look after 800 British wounded and later he was transferred to large German camps where he took care of Allied prisoners-of-war, including hundreds of American airmen and soldiers. So that he could continue this work he refused repatriation.

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Reconstruction

NEUROSIS AND THE MENTAL-HEALTH SERVICE

THE PRESENT AND THE FUTURE

Dr. C. P. BLACKER, at the request of the Ministry of Health, has surveyed existing services for neurotic patients, and submits his proposals for a better mental-health service in England and Wales.[1] These, as Sir Wilson Jameson notes in the foreword, relate to the future rôle of the eleven universities containing medical schools, and to the incorporation of the mental in the general health service. Dr. Blacker outlines the type and size of the service which might be provided for a population of a million treated as an administrative unit. The following is a brief summary of his findings and proposals.

THE FINDINGS

The survey, which is primarily concerned with out-patient services, was begun in October, 1942, and carried out by teams of three investigators in each of the 11 defence regions of England and Wales. A questionary sent to the directors of the 216 psychiatric clinics then active in the country asked for data relating to the years 1938, 1940, 1941, and 1942. Responses varied, but of the 216 clinics, 186 (86%) responded to the questionary and 145 (67%) answered all parts of it.

Outpatient facilities for neurotics were found to be unevenly distributed: in Cheshire, Cumberland, Lancashire, and Westmorland there were 3·66 clinics per million population as compared with 9·14 clinics in Kent, Sussex, and East and West Surrey; the whole south of England was better served than the north. The number of doctor-sessions per million population ranged from 26·7 in the London region to 4·9 in Wales. Of 210 clinics about which information was available, 149 (71%) were held in voluntary hospitals, 30 (14%) in municipal hospitals, 15 (7%) in mental hospitals, and 16 (8%) in places other than hospitals. More than two-thirds of the clinics held in voluntary hospitals were staffed by psychiatrists from mental hospitals—a good example of coöperation, as Dr. Blacker points out. Psychiatric clinics staffed by mental-hospital psychiatrists (M group) are compared with those otherwise staffed (O group). Taken as a whole, M group clinics were established later than the O group, and were less well equipped with social workers, almoners, psychologists, and speech therapists, but better equipped with psychiatric social workers; they held less frequent clinic-and doctor- sessions, saw fewer new patients, and fewer return patients, and dealt with a lower proportion of neurotics and a higher proportion of psychotics. Not all these differences are quite significant; they do not in any case reflect unfavourably on the work done by mental-hospital psychiatrists, who, since 1930, when the Mental Treatment Act first empowered local authorities to provide such clinics, have been largely responsible for developing our outpatient psychiatric service. Of 177 clinics giving relevant information, 148 were established after 1929.

Various types of case-sheets and record cards were used in the different clinics, and in some the psychiatrist only made rough notes which he tore up after telephoning the patient's doctor.

NEUROSIS IN INDUSTRY

Between 1938 and 1942, the numbers and proportions of neurotic patients seen at the clinics rose, but this rise may not be attributable to the war; it is probably due partly or entirely to the growing use of the psychiatric services by general practitioners. Only about 1 new case in 30 seen at clinics in 1940–42 was a psychiatric air-raid casualty, and over a third of these had had some previous psychiatric disability.

INDUSTRIAL CASES

Neurosis in industry was studied with the help of the Ministries of Labour and Supply. Dr. Blacker visited factories, and industrial medical officers (I.M.O.) in key industries during the first six months of 1943, and talked with inspectors of factories, representatives of the mining and shipping industries, of large corporations, and insurance companies. He wished to find out whether there had been an increase in neurosis since the war began and whether the psychiatric services were adequate.

Figures were difficult to obtain, for information was necessarily drawn mainly from large firms employing I.M.O.s rather than from small firms with simpler medical arrangements. In 1936, 97·1% of the registered factories of the country each employed less than 250 people, and 52·7% of all people employed in industry worked in such small firms. Moreover, industrial medicine is itself growing and changing rapidly; medical supervision is not uniform, and records are differently kept in different factories. The men and women working in the factories during the war were those who could be spared from active service, and many had infirmities. In general, sickness-rates and absenteeism were higher among women than among men, not only because of their poorer physique but because of the additional household duties which fell to them. Nearly all I.M.O.s agreed that local facilities for psychiatric treatment could be improved. Intangible minor maladies combined with industrial fatigue to produce a general state of "unwellness" among workers, and there was some evidence from the records of the Post Office and the Central Bureau of Industrial Nursing of an increase of neuroses, especially in 1941 when raids were heavy; but other factors affecting people were long hours, transport problems, the blackout, factory work coupled with home duties, including fire-watching and Home Guard service, shopping difficulties, anxiety, undue responsibility, and boredom.

Dr. Blacker concluded that not all the minor maladies and stresses of industry in war-time needed the attention of a psychiatrist: many cases responded to a fortnight's rest-break. Under the war-time rest-break scheme industrial workers suffering from accumulated fatigue can recuperate at comfortable houses in a holiday atmosphere, free from rules and regulations. No medical treatment is provided and they are not investigated. Dr. Blacker thinks the rest-break service should be continued for at least a period after the war. Careful selection of foremen, forewomen, heads of offices and departments, and of works managers and welfare officers would reduce both unnecessary stress on the workers and the task of the mental-health service. The I.M.O. by appropriate supervision can check minor absenteeism and send those who need it for a rest-break. The industrial medical service coupled with welfare services should be extended to cover the whole industrial population. A few cases will need the help of a psychiatrist, who should be available through the general psychiatric services of the country.

LONG-TERM PLANS

Dr. Blacker suggests that preventive psychiatry is largely a sociological question, on which the following factors will have a bearing: better education of adults on the sensible handling of children; better general education with the early detection of mental defect or disorder, and appropriate training for the affected children; better nutrition, housing, and town-planning; better working and leisure conditions; better industrial, occupational, and social psychiatry, including vocational guidance; and limitation of fertility in prolific and constitutionally inferior types.

Throughout the report he emphasises the importance of proper services for children. He notes the common association of delinquency with mental subnormality or an unsatisfactory home or both. "If every child were educated in accordance with his abilities and aptitudes—

1. London: Humphrey Milford, Oxford University Press. Pp. 218.

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neither above nor below them—if every child were brought up in a happy and harmonious home, and if, on leaving school, every juvenile were fitted into the right job, much unhappiness, neurosis, and delinquency would be prevented."

Better psychiatric services need good psychiatrists in sufficient numbers, good training for them and for psychiatric nurses, sufficient accessory services, and good buildings and equipment. The responsibility for training psychiatrists will continue to lie with the medical schools of universities, where teaching units under professors of psychiatry should be established. He endorses the opinion of the Royal College of Physicians [2] that the medical student should attend 12–20 lectures on normal psychology and a further course of over 50 sessions on psychiatry, with a period of clerkship in a mental hospital or observation ward. A five years' training is recommended for the diploma in psychological medicine.

The teaching units should have in their wards as wide a range of psychiatric patients as possible, including children if there is no psychiatric hostel for these near at hand. Each unit should work in close touch with neighbouring institutions and services capable of providing supplementary instruction.

> These would include mental hospitals, institutions, and colonies for mental defectives, epileptics, drug-addicts, and inebriates, school medical and psychological services, special schools, bodies dealing with the welfare of educable defectives and after-care of the mentally unstable, hostels for abnormal and subnormal children, reablement services, especially those for neurotics, bodies dealing with industrial medicine, prison services, remand centres and homes, Howard Houses and remand schools, and juvenile courts.

The unit should also be closely linked with the social-science and psychology departments of the university, should share fully in university postgraduate courses for general practitioners and others, besides offering postgraduate training to people specialising in psychiatry, and refresher courses to mental-hospital psychiatrists. It should also help to train psychiatric social workers, psychologists, occupational therapists, and perhaps speech therapists; and it should provide a central pathological laboratory and service. As centre of research for the region, the unit should be responsible for raising the efficiency of the region's psychiatric service, and its junior staff should be shared or interchangeable with the staffs of mental hospitals, colonies, and institutions. Much depends on the professor, who should be the inspiration of the psychiatric services of his region.

CHILDREN'S SERVICES

The prejudices of many general practitioners lead them to ignore the help which the psychiatric services could give them. If these are to be outgrown, Dr. Blacker suggests, it will be wise to give special consideration to the services provided for children and young people. Delinquent and dull and backward children have attracted attention during the war years. The problems they present are appreciated by everybody in a way that those presented by adult neurotics are not. Children are recognised, moreover, as likely to respond to prophylactic handling. Since the social worker is one of the most important members of the clinic team, it would be well, he suggests, to start in an area with a children's clinic to which a social worker is attached. Sessions for adults could then be arranged on the same premises as the value of the service became recognised. Better buildings are needed for the treatment of children than for adults, and outpatient departments built for children would serve also for adults seen at different times. During the war hostels were provided for children who, after the evacuation of the cities, were found difficult to manage in the reception areas. These hostels offer the beginnings of residential care for maladjusted children, and should, he thinks, be perpetuated under appropriate psychiatric supervision.

The psychiatric service might well coördinate the educational and mental-health services in such a way that abnormalities and subnormalities are detected early. The white-paper on Educational Reconstruction [3] proposes that the child of eleven, on leaving his primary school, shall be classified and sent to a grammar, modern, or technical school, according to his bent. The age is early for making a momentous decision, and Dr. Blacker suggests that the part intelligence tests can play should be neither underestimated nor exaggerated. They can confirm the teacher's opinion, and sometimes draw attention to abilities in the child which have not been clearly disclosed by his school record—occasionally indicating a better intelligence than his school work suggests. The white-paper proposes that a psychological service should be established under the education authorities to be called on for help when necessary.

> Group intelligence tests might be given, Dr. Blacker thinks, to children at 7, when they pass from the infant to the junior school, at 11, and again at 15 and 16 when compulsory secondary education ends. On leaving school children might take vocational tests. A psychologist working under the education authority would be responsible for these tests.

The duties of child guidance might be divided between the education and health services, the psychologist of the education authority dealing with scholastic difficulties, including the detection and disposal of defective and dull children, and the health authorities with behaviour difficulties, including delinquency. Problems of the first type would be dealt with at child-guidance centres under the education authority, those of the second type at child psychiatric clinics, to be established under the health service as part of the central psychiatric clinics and placed in teaching hospitals, or the hospitals of key towns, with pædiatric departments. The clinics would see children referred by the child-guidance centres, and also those referred by doctors, magistrates, and probation officers.

RÔLE OF THE MENTAL HOSPITAL

The mental hospitals should form closer links with general hospitals, and the mental-health services should be jointly administered by general and mental hospitals. Part-time service should be allowed in mental hospitals, so that the medical staff do both inpatient and outpatient work. Prospects for clinicians should be improved in the mental-hospital service, so that promotion does not necessarily mean diversion of the doctor's abilities to administrative work. Part-time work might attract to the mental-hospital services more women, who have an important part to play in child guidance.

Many of the psychiatric clinics covered by the survey could be more active. They should be centres of social psychiatry, and whether based on voluntary or municipal services should be equally attended by early cases and equally equipped to undertake treatment. Since child guidance should have a prominent place in the mental-health services, the staffs of mental hospitals should take an active part in it. They may also be called on to help in industrial psychiatry, and in the treatment of criminals and delinquents, and to share in the running of psychiatric reablement centres.

MENTAL HEALTH FOR A MILLION

In the longest section of his report, which should be studied in detail, Dr. Blacker sets out his proposals for the mental-health services required by a population of a million.

Many of the replies to the questionary suggested that there should be more beds for early psychiatric cases. Dr. Blacker suggests that for a start 100 beds per million

2. Planning Committee's Report on Medical Education, 1944; and the two interim reports of the Committee on Psychological Medicine, 1943 and 1944.

3. Cmd. 6468. H.M. Stationery Office.

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population should be provided; they should be outside mental hospitals, in teaching hospitals or university medical schools, or in non-teaching hospitals in key towns. In addition, beds should be provided for cases now admitted to observation wards. Outpatient facilities should also be extended by increasing staff at existing sessions, by increasing the sessions of existing clinics, and by increasing the numbers of clinics in an area. The appointments system should be used at outpatient clinics, and no doctor should hold a session lasting longer than three hours, since after that his attention is bound to flag. Authorities should increase their existing outpatient provision by about 75–100% in the course of the next five years.

Child-guidance centres should be established by education authorities at the rate of one for every 20,000 children—that is, there should be about 10 centres for a population of a million, together with 3 or 4 child psychiatric clinics under the mental-health services. The area would also need a hostel for about 50 unstable or difficult children and a children's reception centre to sort and place homeless or destitute children, or children needing immediate care; this centre should be attached to a child psychiatric clinic. Mental-hospital accommodation should be enough to meet the needs of the population, and the staffs should be increased. For mental defectives two or more colonies capable of taking between them 2000–2400 people would be needed; and in all, an area of a million population would need to provide community care for nearly 4000 people, including over 1000 feeble-minded children who would need special schools.

The figures given in this section have been calculated on what data are available, details of which are given.

Dr. Blacker supports the view, widely advocated, that the mental-health services should be coördinated under a medical officer of mental health. Besides helping the various services, outlined to work as a whole, he would be responsible for educating the public in mental health, and would conduct surveys and follow up inquiries. He would need a considerable staff, including psychiatric social workers, an occupational therapist, as well as other psychiatrists, probably working on a part-time basis.

The present supply of psychiatric social workers, psychologists, and occupational therapists falls far short of the probable demand, and limited opportunities for training make it impossible to increase numbers rapidly. Dr. Blacker proposes that demand, supply, and training facilities should be investigated by an official committee containing representatives of the Ministries concerned. It might then be found that a centrally subsidised school, with a larger capacity than any now existing, is needed for the training of occupational therapists, and that training facilities for psychologists and psychiatric social workers should be much extended and improved.

PREVENTION

The importance of a small group of antisocial, backward, and highly fertile people who form about 10% of the population—the so-called social-problem group—is emphasised. He implies that voluntary sterilisation might have a place among the various forms of care extended to people in this group, and recommends that further information about them should be obtained through the central registers which will be kept under social insurance.

THE SHORT VIEW

After some minor recommendations about more uniform record-keeping, education of the public in mental health, more helpful reports from clinics to general practitioners, and kindlier methods of certification, Dr. Blacker suggests some immediate measures which we might apply during the present transitional period. Interim postgraduate psychiatric teaching units might be established to train psychiatrists released from the Forces and others in social psychiatry. Some immediate improvements might be made in training for the accessory services, new outpatient clinics might be started especially by those mental hospitals which do not at present hold them, and outstanding questions affecting the recruitment, training, and registration of mental nurses should be settled.

Special Articles

ROYAL COLLEGE OF SURGEONS OF ENGLAND

A GIFT OF £100,000

THE Hunterian dinner held at the college on Hunter's birthday, Feb. 14, was the first since 1939, and the guests included Ministers of the Crown, ambassadors, representatives of the Dominions, chiefs of medical services, and external trustees of the Hunterian Collection.

The Lord CHANCELLOR (Lord Jowitt), speaking in place of the Prime Minister who was prevented from attending, said that the aims of any sensible Government must be the same as those of the college: the present Government wanted to bring medical and surgical skill within the reach of everyone in this country, but they also understood the necessity to attract men of the right type to the profession. It would be deplorable if they did anything to prevent this; moreover, skill should have its just reward. He advised the profession not to be anæsthetised by the eloquence of the Minister of Health, but to be infected by his eloquence. For the success of a National Health Service the support of the doctors was essential.

Sir ALFRED WEBB-JOHNSON (president), replying to Lord Jowitt's toast of The College, said that a message of loyal and devoted greetings and best wishes had been sent to H.M. the KING, from whom the following reply had been received:

> Please convey to the members of the Council and Court of Examiners of the Royal College, and to the Trustees of the Hunterian Collection, my sincere thanks for their kind message.
>
> As Visitor of the College, I am very glad to hear that the anniversary of John Hunter's birth is once more being observed in the customary manner, and that such generous help towards the restoration of the Hunterian museum has been forthcoming from your fellow-workers in so many countries.
>
> GEORGE R.I.

The presence of so many ambassadors and the Dominion representatives emphasised, said Sir Alfred, the imperial and international value and significance of the college and of its proudest possession—the Hunterian Collection, and the great museum built round that original nucleus with all its richness and order. "We are deeply grateful for the help we have received from so many countries and appreciate their realisation that there can be no more fitting place for an absolutely comprehensive museum of biology and pathology than round the unique collection of the founder of scientific surgery." There were reasons why many of the guests should feel at home in Lincoln's Inn Fields: in the past even physicians had not scorned the district. Despite its attractions and amenities, however, "some are still shy of joining us."

The President then referred to a letter just received from Sir William H. Collins, hon. F.R.C.S., saying that he is making a further gift of £100,000 to provide further endowment of the scientific departments of the college. To this gift certain conditions were attached which could not be divulged till they had been considered by the council and others, but they were such as might profoundly affect the development of scientific medicine at the heart of the Empire. He found it impossible to thank Sir William Collins for all he had done for the advancement of surgery. Much progress, he added, had been made with plans for the restoration of the college so that it may become "a great staff college of learning which it is clear, from letters we receive, that surgeons throughout the world look to us to maintain." From many countries had come gifts and promises of future

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help, and the donations received already amounted to £130,000, or more than half the sum asked for. Priority had been secured for certain repair work, and it was now in progress.

In his concluding passages, speaking of political prospects, the President remarked: "We are told we must keep to the left to be right, and that if we keep to the right we'll be left. But we must be true to our high calling and we must veer neither to right nor to left but keep always in view the goal we have inherited from our forefathers—to give what is best for the people." The people knew they could rely on the profession to go on giving this service, but they would also expect doctors to have a considerable say in the planning of the conditions necessary for rendering it efficiently.

The CHINESE AMBASSADOR (Mr. Wellington Koo), replying to the toast of The Guests proposed by Sir MAX PAGE (vice-president), said that in China, as here, barbers formerly claimed to be surgeons; and so also did butchers. Referring to the recent birth of UNO, he maintained that she had stood the strain and stress remarkably well: she had had 51 nurses, yet she still lived. He believed that the spirit of service for humanity was taking root among the nations and would grow. The FIRST LORD OF THE ADMIRALTY (Mr. A. V. Alexander) spoke of what the profession has done both for the voluntary hospitals and for progress in public medicine. Further progress could not be held back by individual or sectional interests: it was a duty to see that all the knowledge obtained should be open to every member of the community. Recalling the woeful prophecies about National Health Insurance, he felt sure that the National Health Service would expand rather than contract the activities of the profession.

Sir HENEAGE OGILVIE (vice-president) proposed the health of The Hunterian Orators, coupling it with the names of Prof. A. H. Burgess, Mr. Victor Bonney, and Prof. G. Grey Turner, who gave the orations of 1941, 1943, and 1945. Professor GREY TURNER replied.

The guests included:

Viscount ADDISON, F.R.C.S., Secretary of State for Dominion Affairs; Mr. JOHN BEASLEY, resident minister for Australia; Mr. ANEURIN BEVAN, Minister of Health; Mr. HAROLD CLAUGHTON, principal of the University of London; Mr. ERIK COLBAN, the Norwegian Ambassador; Sir WILLIAM H. COLLINS; Surgeon Vice-Admiral H. ST. C. COLSON, medical director-general of the Navy; Dr. H. GUY DAIN, chairman of council, B.M.A.; Sir HENRY DALE, O.M., hon. F.R.C.S.; Sir ALLEN DALEY, county medical officer for London; Sir HERBERT EASON, president of the G.M.C.; Prof. A. W. ELLIS, regius professor of medicine at Oxford; M. F. T. GOUSEV, the Soviet Ambassador; Mr. J. M. GRAHAM, F.R.C.S.E.; Sir WALTER HAWARD, director-general of medical services, Ministry of Pensions; Dr. CHARLES HILL, secretary of the B.M.A.; Mr. EARDLEY HOLLAND, F.R.C.O.G.; Sir ALEXANDER HOOD, director-general, Army Medical Services; Sir WILSON JAMESON, chief medical officer, Ministry of Health; Mr. E. H. KEELING, M.P., mayor of Westminster; the Rt. Rev. PAUL DE LABILLIERE, dean of Westminster; Sir ALAN LASCELLES; Lord LEVERHULME; Baron DE CARTIER DE MARCHIENNE, the Belgian Ambassador; Mr. VINCENT MASSEY, high commissioner for Canada; Sir EDWARD MELLANBY, secretary of the Medical Research Council; Lord MORAN, F.R.C.P.; Sir ALFRED MUNNINGS, P.R.A.; Prof. HUGHES PARRY, vice-chancellor of the University of London; Mr. CHARLES ROBERTSON, chairman of the L.C.C.; Sir ROBERT ROBINSON, F.R.S.; Sir S. RUNGANADHAN, high commissioner for India; Prof. S. SARKISOV; Mr. H. S. SOUTTAR, president of the B.M.A.; Mr. R. ATKINSON STONEY, representing F.R.C.S.I.; Sir HUBERT WALLINGTON, treasurer of Gray's Inn; Sir LIONEL WHITBY, regius professor of physic at Cambridge; Air Marshal Sir HAROLD WHITTINGHAM, director-general, R.A.F. medical services; Lord WRIGHT OF DURLEY, treasurer of the Inner Temple.

Surgeon Rear-Admiral C. P. G. WAKELEY has been appointed a commander in the Legion of Merit by the President of the United States, for distinguished services to the United States medical service.

Surgeon Lieutenant D. R. RIGG, M.B., R.N.V.R., has been awarded the Czechoslovak military medal of merit (first-class) for service to the Czechoslovak section of Warwick Hospital.

GENERAL MEDICAL COUNCIL

THE General Medical Council held an extra session beginning on Feb. 12 to dispose of arrears of penal cases. Sir HERBERT EASON, the president, took the chair. Dr. George Macfeat Wishart joined the council as representative of the University of Glasgow for five years.

PENAL CASES

The case of *Eric Llewelyn Williams*, registered as of 16, Minydon Avenue, Old Colwyn, Denbighshire, M.B. Wales (1931). In May, 1943, the council found that Dr. Williams had been convicted of using motor fuel unlawfully and of being drunk in charge of a motor-car, and postponed judgment. Dr. Williams now produced satisfactory testimonials, and the council dismissed the case.

Theft of Patients.—The complaints against the following three practitioners were heard together: *William Samuel Dixon*, registered as of Laurel Hill, Sunderland Road, Horden, co. Durham, M.B. Dubl. (1923). *John Trotter*, registered as of Rosneath, Thorpe Road, Horden, co. Durham, M.B. Glasg. (1928). *Robert Campbell Thomson*, registered as of Park House, Horden Colliery, co. Durham, M.B. Durh. (1934).

Dr. Dixon was defended by Mr. Oswald Hempson, solicitor, acting for the Medical Defence Union; Dr. Trotter by Mr. Aiken Watson, instructed by Messrs. Stilcoes, solicitors; and Dr. Thomson by Mr. Hempson privately. The complainants, the London & Counties Medical Protection Society, were represented by Mr. A. A. Pereira, instructed by Messrs. Le Brasseur and Oakley, solicitors.

The collective charge against these practitioners was that, in breach of an agreement made with Dr. Myer (or Michael) Rooms, they had appropriated to their own practice patients who rightfully belonged to the practice of Dr. Rooms. The case was dismissed, the President announcing that the facts had not been proved against the respondents.

False Pretences.—The case of *William Allan*, registered as of 329, Park Road, Oldham, Lancs, M.B. Glasg. (1926), who had been sentenced to three months' imprisonment for cashing a worthless cheque in Halifax in October, 1945. When the council's solicitor had proved the conviction (after which the accused had asked the court to take into consideration four other offences), the President recalled that Dr. Allan had appeared before the council on two similar charges in 1941. The respondent said the fraud had been due entirely to drink. He had expected to have funds to meet the cheque. He had started to pay the debt as soon as he had obtained work, and intended to discharge it.

The President administered a stern warning, and announced that the council's decision was postponed for two years, but they desired to see Dr. Allan at intervals during that time.

(To be concluded)

NURSING RECRUITMENT IN SCOTLAND

THE Nursing Recruitment Centre set up by King Edward's Hospital Fund for London has proved its worth in the past six years, and now Scotland has decided to follow suit by setting up a similar service. The Nuffield Hospitals Trust, who have undertaken to be responsible for the new service, called a meeting to initiate it on Jan. 11, at which Mr. Joseph Westwood, Secretary of State for Scotland, described some of the ways in which the new service hopes to be of use to nursing candidates. Like the London centre it will try to place girls in the types of hospitals most suited to their temperament and education; and it will attempt to persuade hospitals to improve conditions where these are unnecessarily burdensome and discouraging. He mentioned the improved salary rates now offered to nurses, and the publicity which is being given to nursing as a career. Education authorities are being encouraged to set up pre-nursing courses, and the nursing charter is expected in time to raise the standard of conditions not only for nurses but for domestic workers in all hospitals. It is to be hoped that the new venture will prove as successful as its London forerunner; probably nothing would improve conditions in nursing so rapidly as the influx of large numbers of vigorous young women determined to give their patients the best possible care and also to make nursing itself the enviable and respected profession it should be.

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Parliament

ON THE FLOOR OF THE HOUSE

MEDICUS, M.P.

PARLIAMENT is becoming acclimatised to heated debates, and that on the repeal of the Trades Disputes Act of 1927 rose to a high temperature. But it was, often enough, not a debate but an exchange of shots from one party to another. The vitally important debate on the food situation was of a different kind altogether. It opened vistas on the international and national problems which are fundamentally economic and only secondarily political.

The question asked was not only why was the country not told earlier—because the country was told—but why, when we knew how bad world food conditions were, the Minister of Food went out of his way to reassure us before suddenly making his most recent, and depressing, announcements of food cuts. A further debate is needed to discuss what can be done to improve rations in this country. It is true that the general level of health has been well maintained in war, but it is also certain that an improvement in rations and the provision of a greater variety in diet would make for more content. Probably, also, as the Prime Minister seems to realise, it would lead to greater production, and that, in a world of shortages, we must have. There are many well-informed people who consider that one of the reasons for the drop in coal output is a deficiency in the rations of the miner quâ miner.

There are psychological factors, too, as Sir Ben Smith realises when he proposes putting a stop to expensive banquets. The scandal of the black market for poultry, for example, sticks in the gizzard of the ordinary citizen who cannot go to the luxury hotels or restaurants. This discrepancy in feeding is not confined to London. It exists also in Edinburgh, Birmingham, Manchester, and in other cities. Mr. E. Walkden, the parliamentary private secretary of the Minister of Food, went deeply into this black market question in the days of the Coalition Government. Now is his opportunity to pass on his knowledge to the Minister and get things done.

In the application of scientific knowledge the Government is well advised on the production of food and on nutritive values. But it needs something more. Every ambassador or minister of this country should have on his staff a scientific adviser conversant with the problems of nutrition who could keep him fully informed on the conditions in the country to which he is sent. The Foreign Office did, early in 1945, appoint such an adviser to the Paris Embassy and her work has been of great value. The experiment should be extended, and the sooner the better. This parliament is making big changes and it should not be afraid to make a still greater use of scientific knowledge in the direction of day-to-day affairs.

The Chancellor of the Exchequer has announced that in future the Attorney-General and the Solicitor-General will receive inclusive salaries of £10,000 and £7000 respectively instead of the larger income they have hitherto been receiving in fees. Fees will still be paid for services rendered by these Ministers in their public legal capacity, but the surplus over the sums now fixed will accrue to the Exchequer. Is this perhaps the thin end of the wedge of a National Legal Service, parallel with the National Health Service? The figures quoted also give a good yardstick for the measurement of payments to the leaders of the medical profession in the National Health Service.

Replying to a question, Sir BEN SMITH, the Minister of Food, said that the number of priority consumers (excluding establishments such as schools and hospitals) registered for liquid milk in Great Britain in September, 1945, was approximately 13 million. The extra amount of milk authorised for their consumption is about 5 million gallons weekly.

FROM THE PRESS GALLERY

The Prevention of Rickets

On the motion for the adjournment on Feb. 11, Dr. STEPHEN TAYLOR pointed out that though the causes and the method of prevention of rickets were both known, and the material necessary to prevent it was available, it was not done. The survey made for the Ministry of Health by the British Pædiatric Association in 1944[1] showed that at least 24,000 children in this country suffered from rickets every year. During the war the Ministry of Food had made available cheap or free supplies of cod-liver oil containing vitamin D_2, but a war-time social survey found that of 900 mothers selected at random only 40% were collecting their cod-liver oil. Dr. Taylor urged the Government to give a trial to a more popular alternative. He affirmed that 0·1 mg. of calciferol—or enough vitamin D for one week—dissolved in about 15 mg. of bland arachis oil mixed perfectly and tastelessly with cocoa-butter and could be used for making chocolate which tasted like ordinary chocolate. A penny bar of this chocolate taken once a week would contain everything needed to prevent rickets.

Mr. C. W. KEY, parliamentary secretary to the Ministry of Health, admitted that the Ministry were concerned that only about a quarter of mothers with young children were collecting their cod-liver oil. Vitaminised chocolate was being produced, but there was a lack of vitamin-A concentrate, and it would not be possible to use cod-liver oil for fortifying the chocolate. The need for this addition was among infants of the lower age, and the Ministry were advised that these children would not be properly treated if chocolate was used; but they were carrying out experiments in coöperation with the Ministry of Food.

Short Commons

In opening the debate on Feb. 14 on the world food shortage, Mr. EDEN'S main complaints were that the Government, while making more or less reassuring statements, had shown lack of foresight; that there was not sufficient coördination between Ministers; and that there had been a failure to take timely action. He appealed for greater frankness in future. This criticism found considerable support in the debate, and Sir ARTHUR SALTER, Independent member for Oxford University, urged that there was a special need on the part of Parliament and Ministers to overcome war-time habits of official secrecy. He agreed our present stocks, as given by the Minister of Food in the previous week, were getting near the danger point. He congratulated the Government on taking every international means open to them to ease the situation; contemplating, as he thought they did, a food conference; and on trying to see that every country with anything to spare was dealing with this food problem, not as a national or British problem only, but as a world problem.

Sir BEN SMITH in reply claimed that he and other Ministers had warned the House from October onwards about the seriousness of the situation, and that it not only would continue long after the war ended, but would be accentuated by the needs of demand from liberated countries. Shortages of rice and fats had been accentuated by the fact that an abundant supply of wheat was no longer available. Against world import requirements of 17 million tons in the first six months of 1946 much less than 12 million would be available. Many millions of people in Europe and the Far East would face hunger and starvation, and 125 million people in Europe would have to subsist on less than 2000 calories a day, and in some areas large numbers would receive as little as 1000 calories per day. The total wheat stocks in the four main exporting countries had fallen from 46 million tons in July, 1943, to 22 million tons. The European harvest, which before the war yielded 45 million tons, fell to 23 million. As a result of the examination which the United States Secretary of Agriculture and he had made at Washington it was clear that the world was short of at least 5½ million tons of wheat, or a third of the total requirements. He accepted a cut in the British allocation of about a quarter of a million tons. This necessitated an increase in the extraction-rate and a reduction in the supply of animal-feeding stuffs. Since

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1. See *Lancet*, 1944, i, 699.

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his return from Washington the position had still further worsened, and despite the efforts of the governments of Canada, Australia, and the United States to ease the situation, this country might have to raise the extraction-rate still higher, or use coarse grains as diluents in the bread; but he hoped that that might be avoided.

Turning to the Far East, he said that in 1946 exports of less than 1½ million tons of rice were expected from Burma, Siam, and Indo-China, compared with a pre-war export of about 6 million tons. Supplies of ground-nuts from India had also dropped, and a whaling expedition to the Antarctic had fallen short of expectations. As a result we should be short in 1946 of our total oil supply by well over 100,000 tons. It had never been his intention to discontinue the issue of dried egg permanently. Summing-up, Sir Ben Smith said that, while he did not wish to leave the impression that all was well, the food position was not as bad as the Opposition thought. The world sugar position was precarious. He would do his best to maintain the bacon ration. Cheese and starch were causing anxiety. He warned the House that failure to get the American loan would cause further difficulties. There was a prospect of improvement in the deliveries of bananas, oranges, and lemons, and fruit and vegetable imports would be encouraged. Milk supplies were better than last winter, fish supplies would be back this year at least to pre-war level, the potato situation was satisfactory, and there were more shell eggs.

QUESTION TIME

Social Research Council

Dr. STEPHEN TAYLOR asked the Lord President of the Council if the Government would establish a Social Research Council, on similar lines to the Medical Research Council, in view of the difficulties under which social scientists had laboured in this country in the past.—Mr. HERBERT MORRISON replied: I understand that the committee under the chairmanship of Sir John Clapham, which is, at the request of the Chancellor of the Exchequer and myself, examining the adequacy of the existing provision for research into economic and social questions, has given considerable attention to this point, and I would prefer to wait and see any observations on it that may be made in their report before reaching any conclusion.

Nutrition in Newfoundland

Mr. J. LEWIS asked the Under-Secretary of State for Dominion Affairs what action has so far been taken in Newfoundland to deal with malnutrition resulting from dietary deficiencies; and when the report on the whole subject is to be published.—Mr. J. PARKER replied: Acting on expert advice, the Newfoundland government have taken fortified flour and margarine to overcome the lack of balance in the normal diet of sections of the Newfoundland people. In addition they invited a committee of experts on nutritional questions from the United Kingdom, Canada, and the U.S.A. to visit Newfoundland in the summer of 1944 to survey the island. The report of this committee was published in the *Canadian Medical Association Journal* in the spring of 1945 (see *Lancet*, 1945, i, 760) and it has since been the subject of detailed study by the commission of government. A further visit to Newfoundland was undertaken in August of last year by Dr. D. P. Cuthbertson, now director of the Rowett Research Institute, who, during the course of his discussions with the Newfoundland authorities, put forward a number of preliminary recommendations for their consideration. Dr. Cuthbertson's full report is expected shortly.

Congenital Defects in German Measles

Dr. TAYLOR asked the Lord President of the Council if his attention had been drawn to investigations suggesting that deaf-and-dumbness in infants results from an attack of German measles in the mother during early pregnancy; and if, in view of the importance of this matter, the Medical Research Council would speedily undertake the investigation needed to substantiate or disprove these findings.—Mr. MORRISON replied: The Medical Research Council have received reports from Australia suggesting that certain congenital defects in children, including deafness, may be causally connected with infectious disease in the mother during pregnancy. They are already investigating the subject and the question of the effect on the child's hearing is receiving special attention.

In England Now

A Running Commentary by Peripatetic Correspondents

I ARRIVED in Poland with 3 tins of cocoa and 6 of dried milk in an untidy paper parcel as my contribution to starving Europe. As we drove from the airfield to Warsaw's political centre, the Hotel Polonia, I noticed barrels of apples on sale in the streets. Then in a café window such cream cakes as I'd long since ceased to dream about. Finally the waiter knocked at my bedroom door: "It's a little late, Sir, but would you care for breakfast—two eggs or three, and ham or bacon?" Poland is certainly a country of contrasts. If you have the money, there are five-course lunches, fully fashioned nylons, and Chanel Cinq (for the ignorant, the safest bet in the scent line). If you have an artisan wage, you live in half a room or in a wood and mud shack on bread, vegetables, and soup. So it's hardly surprising that the medical supplies Poland needs most are not surgical instruments and drugs, but livestock, lorries, and tractors. Poland is normally a food-exporting country. Now the difference between starvation and a bare subsistence minimum is being bridged by UNRRA supplies. The Poles are getting their agriculture going once more; the big estates have been broken up; coöperative marketing is developing; but I think it will be the middle of 1947 before Poland can hold her own on the food front.

The Germans stole the bulk of Poland's livestock. So what little milk there is goes to expectant mothers and young children. For the rest, the rationing system is primitive. Only workers in nationalised enterprises and in enterprises engaged on more than 50% of government work (and their families) get ration cards. Since all industry employing more than 50 workers per shift has been nationalised, about 60% of the urban population are entitled to rations. These rations—bread, a little tea, sugar, and fat—are sold at controlled prices, but distribution difficulties are so great that rations are not always obtainable. All other food is sold on the free market, with no price control. Prices are very high, but as supplies increase they are beginning to fall. This system was in fact the only one possible, because the German occupation and the bloody liberation of the country by the Russians had virtually destroyed all administrative machinery. Its results are, first, that there is gross inequality. Next, there can be no black market because there is no price control. Finally, there is a rush for government jobs, so as to get ration cards; and since Civil Service wages are very low, many civil servants do a second job after office hours.

In the destroyed cities—Warsaw and Wroclaw (Breslau), for example—overcrowding is appalling, but rebuilding has begun both here and in the countryside. With an overcrowded population, badly fed and intermittently starved for six years, it is natural that tuberculosis and infant mortality should present the two biggest health problems. Before the war, Poland had the second highest infant death-rate in Europe. Now it is more than doubled, and in many parts 50 out of every 100 babies born die before the age of one. Of those who survive, a great number develop rickets. The death-rate from tuberculosis has gone up 8 times. About 40% of school-children and 25% of university students show evidence of tuberculosis.

The third great scourge of Poland is venereal disease. Treatment is free, but presents an almost impossible problem because over a million people have registered to receive it. Furthermore, the Germans supplied their soldiers with sulphonamide drugs to take, as a means of preventing gonorrhœa. As a result, the Polish gonococcus is sulphonamide-resistant. UNRRA is sending in large quantities of penicillin by air, and fortunately this is proving most effective.

I expected to find epidemics raging in Poland. It is a tribute to Dr. Litwin, the minister of health, and his staff that this is not so. Typhus had been reduced to 100 new cases a week, almost all in the new territories acquired from Germany. Typhoid, also worst in the West, is now under control, and in the areas of greatest risk over half of the population has received anti-typhoid inoculation. One of the difficulties is that the Germans are hiding cases of typhoid from the Polish doctors and hospitals. This is not surprising when one

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remembers the way the Germans treated the Polish sick. In Cracow, for example, all the senior medical staff of the hospitals were removed to concentration camps (where half of them died) and untrained German doctors and surgeons were put in charge to get experience on the Polish patients. The only epidemic of any seriousness was an outbreak of diphtheria in Lodz; there the Polish medical staff were in difficulties and only half the children could receive antitoxin. Before the war vaccination was compulsory in Poland; between 90 and 95% of children were vaccinated; and smallpox had been unknown for many years. Since the war vaccination lapsed and there have been a few cases, but no epidemic.

We in England reckon we are short of doctors with something like one per 1000 of population. In Poland, before the war, there were 12,000 doctors. Now there are 6000 to a population of 22 million. More than three-quarters of Poland's population is rural; yet more than half the doctors are in the towns. Combined with the appalling lack of transport, the result is that most of the peasants just have no medical service at all. The government has recently introduced legislation to direct doctors under 55 into rural areas, and peasant coöperative medical insurance schemes are being started. The nursing situation is even worse. Pre-war there were 29,000 trained nurses; now there are 9000, and nursing recruitment is as much a problem in Poland as in England. With such a shortage of personnel, any comprehensive health service on our lines is out of the question. As with us, hospitals are municipal and voluntary, the latter being mainly Church or university institutions. Their buildings are variable, but the quality of work is good. Waiting-lists are appalling and many more hospitals are needed. Medical training is being speeded up, and the percentage of women doctors is increasing (now 20% of students), but there is still some prejudice against them.

* * *

There is mutiny in the home. Amazon cries for the blood of Sir Ben are heard in a thousand houses where a few short weeks ago the daily chores were pursued in domestic peace. The Minister of Food himself applied the spark to the powder-keg on which he was perched by casually dropping dried eggs, having been apparently unaware of their explosive charge. In these days of public-relations departments, propaganda, and polls of opinion, when the thoughts of the nation are systematically canalised, converted, or docketed, it is refreshing to encounter a Minister with his head in the air (or is it the sand?), heedless of the passing throng. Not so heedless now, for the hunt is up, and the ladies won't let any Gallup save their prey.

The housewife's case deserves a sympathetic ear; that it has not been more widely heard before is due simply to her long forbearance. For more than six years she has daily sought to devise new dishes from all-too-familiar ingredients, to make four ounces do duty for a pound, to satisfy young appetites by forgoing her rightful share. For more than six years she has, without help, maintained the home by making and patching and mending. And for more than six years she has plodded forth and wasted precious time in queues, often to be rewarded with "only for our regular customers," or "none till Friday." Whoever else stole a holiday, it was not the housewife. She has been always on the job, living not over the shop but in it. She sustained herself by glorious dreams of "after the war," and when the war did at last end, no-one told her bluntly that times for her would still be hard and might even get harder. Now she is tired out. Around her she sees almost every other section of the community returning towards normal with relaxation of controls and the issue of better supplies, whereas the first winter of peace will end for her with all the old restrictions still in force, and a few new ones for good measure.

It behoves us to avert a sit-down strike in the kitchen. How can we help? In the first place, the distributive trades are still grossly understaffed. The defence produced in some quarters that delay in shopping is due to shortage of supplies is specious, or—not to put too fine a point on it—phoney. The delay is due to shortage of labour behind the counter. Has it occurred to nobody that more man-hours are wasted by people waiting in queues than would be sacrificed by allotting extra assistants to the shops? This is a simple theory, and therefore unlikely to be considered sound economics, but it appeals to me.

If the housewife cannot have more eggs and cooking fat for cakes and puddings, at least give her some latitude in the non-essential foods. Let us use every available hold in ships returning from countries in the sterling bloc for foods that were rightly excluded during the war—all those non-essential oddments that used to delight our palates, and which can now ease the lot of the cook in her continued plight. Come to that, are we making fair use of present supplies? What of the 12% that goes to catering establishments? Does each household (collectively or through one member) take an eighth of its food outside the home? If not, then the present system is unfair and should be replaced by one demanding the surrender of a coupon for every meal taken in a public place which contains rationed food. The administrative objections to this course must bow before the need for an equal share for all.

The housewife has long been pondering on these questions. Now she has suddenly found her voice and spoken with a force that has compelled attention. It is a feminine gibe that the regulation of food (and, for that matter, of clothes) is devised by ignorant males with no understanding of domestic matters. This may be unjust; but I hope the Government will not lightly dismiss the housewife's claim for a place in the councils of the Food Ministry. In the meantime, the Minister of Food ought to desert his office one day and spend an hour or two in a queue—his ears would burn.

INDUSTRIAL REABLEMENT

AT a luncheon in London on Feb. 13 to mark the start of new development at Roffey Park Rehabilitation Centre, Lord HORDER, the chairman, said that the centre had provided a unique service; the time had come to inaugurate the second chapter—that of training and research.

Sir STAFFORD CRIPPS, President of the Board of Trade, emphasised the importance of domestic stress in determining breakdowns among industrial workers. Rehabilitation after medical illnesses had not received the same attention as the rehabilitation of surgical disorders, and the mental casualties of industry were apt to become wasted derelicts for lack of proper attention. He supported Lord Horder's concept of *sub-health*; the aim must be to replace this by positive health. If machines were to be used efficiently, the operators must be physically and psychologically fit; morale, good health, and proper selection were all important. In the Services the individual had been considered as an individual, and not merely as one unit in a statistical calculation; the same approach was needed in industry. The time had come to study the science of happiness and comfort rather than the techniques of speed and mass murder. Roffey Park provided, for the sub-health group, treatment which restored their happiness and confidence. A training and research department was now to be developed; this would break down the barrier between doctor and industrialist, and help to coördinate modern science and industrial experience.

Mr. GEORGE TOMLINSON, Minister of Works, supporting an appeal for money for the second phase of the work at Roffey Park, suggested that employers should put aside money for depreciation of their employees in the same way as they did for their machines. Roffey Park had added to the country's productive capacity.

In addition to its existing facilities (see *Lancet*, 1945, ii, 607) the centre is now to provide residential training courses in industrial health and resettlement for the benefit of managerial staffs and medical, personnel, and welfare officers; it is hoped that trades-union officials will also attend. The staff will spend part of its time in factories and offices, giving technical advice and carrying out surveys.

THE British Social Hygiene Council proposes to hold a summer school at Wadham College, Oxford, from Aug. 1 to 15. The inclusive fee of the course, which is intended primarily for teachers, is fourteen guineas. Further particulars may be obtained from the council at Tavistock House North, London, W.C.1.

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Letters to the Editor

CONGENITAL DEFECTS FROM GERMAN MEASLES

SIR,—I am trying in a small way to carry out an investigation something like that you suggest in your leader of Feb. 9. I have devised a very simple form of questionnaire and have asked the heads of three large schools for the deaf to put it to the mothers of young children attending their schools. I have also asked Dr. and Mrs. Ewing, of the Department of the Education of the Deaf, Manchester University, to put the questionnaire to mothers who bring children to their clinic. All have expressed their willingness to coöperate and I am hoping to receive completed questionnaires from one of the schools shortly.

I do not suggest that this small-scale inquiry is going to settle anything and welcome your suggestion that the problem should be the subject of full-scale investigation. I should be very willing to pass on such information as I may be able to obtain and to give the investigator any help I can.

A. H. GALE.

Ministry of Education (Medical Branch), London, S.W.1.

NUTRITION IN NEWFOUNDLAND

SIR,—In your annotation of June 16, 1945 (p. 760), you drew attention to the high proportion of salted meat and salted fish in the Newfoundland diet. Benesch and Glynn (Dec. 22, p. 831) suggest that the high salt content of the diet in Newfoundland may be a factor, by virtue of its effect on the intestinal flora, in the occurrence of certain symptoms of deficiency of the B-complex vitamins, more especially nicotinic acid. This immediately raises the question, is there in fact an abnormally high intake of sodium chloride in Newfoundland?

It is generally agreed by British and American workers that the usual sodium chloride intake is of the order of 7–15 g. daily, of which a large proportion is taken as added salt.[1] In hot climates the intake may be much higher. For instance, according to a War Office report,[2] "The total salt intake, including the amount of culinary salt likely to be taken, which is available on a fresh (Army) ration scale in the Middle East is from 17 to 20 g.; on a tinned ration scale, from 22 to 25 g." This report puts the daily salt requirement for those engaged in sedentary occupations at 12 g. and for those working hard for eight hours a day at 24 g.

The sodium content of the average British diet, calculated by applying McCance and Widdowson's tables of analyses [3] to food-consumption data from a large pre-war dietary survey, is approximately 920 mg. per head per day exclusive of sodium added as culinary salt in cooking or at table. This estimate agrees well with the figure of 960 mg. sodium per day in the average American diet quoted by Shohl.[4] If we assume that all the sodium is present as sodium chloride, which is of course an overestimate, the British and American diet would provide on the average 2·5 g. of sodium chloride out of a total intake of 7–15 g. An estimate of the sodium content of the average Newfoundland diet can be obtained in the same way from the food-consumption data provided in the report of Adamson et al.[5] If all the meat used is taken as salt pork and all the fish as dry salt cod the sodium content of this diet is approximately 1770 mg. per head daily, or 4·5 g. sodium chloride.

These figures indicate that although on the average the foods constituting the Newfoundland diet may provide twice as much sodium chloride as the foods in the average British diet they would provide only half or a third of the average British *total* intake of sodium chloride. Since the average intake of dietary sodium chloride in Newfoundland is 4·5 g. it is clear that in practice some people will get more and some less than this amount. A rough calculation of the per head intake of dietary sodium chloride of 25 Newfoundland families based on the food purchases recorded by Aykroyd [6] during the winter of 1929 shows that although the diet of half of the families provided more than 4·5 g. per head daily none exceeded the upper estimate of *total* British or American intake. It seems reasonable to suppose that the Newfoundlander, who consumes meat and fish preserved with salt, and little fresh food, may consume less culinary salt than is usual on a diet of fresh foods. In the absence of studies to show the total intake from all sources, including culinary salt, it would be unwise to draw hasty conclusions about the salt intake in Newfoundland.

A word of caution seems necessary also in the interpretation of the data of Eppright et al.[7] quoted by Benesch and Glynn as showing an inverse relationship between the intestinal coliforms and the salt content of the diet. Eppright et al. showed that, in rats, a diet almost free from mineral salts could not support the growth of *L. acidophilus* and favoured an increase in the intestinal flora of organisms of the *Escherichia coli* and *Proteus* types and of *Streptococcus fecalis*. The *L. acidophilus* flora reappeared when a complete salt mixture or a mixture of calcium and phosphorus was added to the diet, but sodium chloride and potassium were not essential for *L. acidophilus*, so that their removal from the complete mixture had no effect on the flora. When they were the only salts added to the basal diet they could not support the growth of *L. acidophilus*, and the other organisms increased in numbers at first and then declined. In all of these experiments where salts were added to the basal ration they were given in the amounts usually consumed by rats from a salt mixture. The effect of high intakes was not tested. It does not follow that increasing the sodium chloride content of a diet which already supports the growth of *L. acidophilus* would result in replacement of this organism by others such as the coliform bacteria.

In view of these considerations any attempt to explain the occurrence of symptoms of nicotinic acid deficiency in Newfoundland by postulating that a high intake of sodium chloride causes changes in the intestinal flora with resultant reduction in synthesis or increased destruction of nicotinic acid in the intestine seems to be, to say the least, premature.

F. C. RUSSELL.

Imperial Bureau of Animal Nutrition, Rowett Research Institute, Bucksburn, Aberdeenshire.

TUBERCULOUS RHEUMATISM

SIR,—I was interested to read Dr. Sheldon's article in your issue of Jan. 26, as I have recently seen three adults with rheumatic manifestations associated with active pulmonary tuberculosis.

CASE 1.—Female, aged 30. Husband had died of pulmonary tuberculosis one year ago. She had had an attack of rheumatism at the age of 14, and had been in bed for 7 months with flitting joint pains which did not respond to treatment; in the last fortnight had developed severe cough and sputum. Pulse-rate 136; temp. 98·6° F; mitral systolic murmur; rhonchi and crepitations over left upper lobe; no marked swelling of joints. Sputum found to contain tubercle bacilli.

CASE 2.—Male, aged 28. Brother had recently died of pulmonary tuberculosis. Sputum found to contain tubercle bacilli in 1933, but had refused treatment till 1935, when extensive infiltration was found in the left lung, with cavities in the upper lobe. Treated with artificial pneumothorax, 'Sanocrysin,' and, later, phrenic evulsion. Discharged with negative sputum and disease mainly calcified, and worked from 1940 to 1944. In 1943 cavitation was again noted in the left lung, and in October, 1944, had to go to bed with acute rheumatism. Sputum now contained tubercle bacilli, and X-ray film showed bilateral cavitation. Has since been a chronic invalid, whose condition has slowly deteriorated.

CASE 3.—Male, aged 42. Daughter had attended dispensary with tuberculous adenitis. Stopped work in June, 1944, complaining of pain and swelling of feet, and pains in arms and shoulders and across chest. Was referred for electrical treatment to hospital, where X-ray examination showed bilateral tuberculosis with a cavity on the right side. Was

1. McCollum, E. V., Orent-Keiles, E., Day, H. G. Newer Knowledge of Nutrition, New York, 1939, p. 208; Macy, I. G. Handbook of Nutrition, Chicago, 1943, p. 91.
2. *Army med. Dep. Bull.* 1943, no. 21, p. 6.
3. McCance, R. A., Widdowson, E. M. Chemical Composition of Foods, *Spec. Rep. Ser. med. Res. Coun., Lond.* no. 235, 1940.
4. Shohl, A. T. Mineral Metabolism, New York, 1939, p. 317.
5. Adamson, J. D. et al. *Canad. med. Ass. J.* 1945, **52**, 227.
6. Aykroyd, W. R. *J. Hyg., Camb.* 1930, **30**, 357.
7. Eppright, E. S., Valley, G., Smith, A. H. *J. Bact.* 1937, **34**, 51.

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treated in bed at home, where he developed increasing pains affecting ankles, knees, hips, shoulders, and wrists, unresponsive to salicylates. Pulse-rate and temperature were normal. Blood-sedimentation rate 80 mm. in 1 hour (Westergren). Six months later still had these pains, and general condition was gradually deteriorating.

Rheumatic symptoms were presented by two of these patients when pulmonary tuberculosis became manifest, and by the third when a spread of the disease was found. It is interesting to speculate whether the rheumatic symptoms were due to tuberculous toxæmia, or whether the rheumatic condition was an intercurrent disease which lowered the body's resistance to the tubercle bacillus. In favour of the second hypothesis is the fact that the first case had had a previous attack of rheumatism at the age of 14, before she had contracted tuberculosis.

WILLIAM D. GRAY
Bishop Auckland, co. Durham. Temporary assistant tuberculosis officer, Durham County Council.

POISONING BY BARIUM CARBONATE

SIR,—Lieut.-Colonel Morton's article (Dec. 8) from the Iraq-Persia Command prompts me to record a similar instance from the Alexandria area. On Aug. 11, 1945, the local military authorities asked us to help them to investigate an isolated outbreak of food-poisoning, involving a number of men of an Indian unit, who had fallen ill after eating pastries made with flour and a vegetable oil (*ghi*). There was one death.

Samples of the flour and the oil were supplied, and both bacteriological and chemical examinations were undertaken. Nothing incriminating was found in the bacteriology of either, but after incineration of the flour, and taking up the ashes in HCl, the solution gave the usual chemical tests for Ba, and certain tests for Al. The presence of Ba was confirmed spectroscopically. That it was present in the form of carbonate was proved by the evolution of CO_2 when a drop of concentrated HCl was allowed to fall on a little of the sample spread on a glazed porcelain plate. Consequently we were able to report on Aug. 28: "the marked presence of soluble salts of barium (as carbonate), also of aluminium, leads one to think that the barium content of the flour is the chief incriminating ingredient responsible for the poisoning." A quantitative report on Sept. 12 indicated: "Ba (as carbonate) 6·25%, and Al (as oxide) 2·5%."

Misadventure by rat-poison flour may be more frequent and widespread in the Services than one might imagine. It has been suggested that such flour should be mixed with some colouring matter, but the rat is such a clever animal that it is doubtful whether coloured flour would achieve its purpose. When the poison is kept in the same store as ordinary flour distinctive exterior labelling is the obvious answer. As Chesterton's postman story showed, one is apt to neglect the obvious.

Municipal Laboratories, Alexandria. ARTHUR COMPTON.

NATIONALISATION OF MEDICINE

SIR,—Mr. Willson-Pepper's article (Jan. 26) describing what he saw in a German military hospital shows what can happen when medical science, art, and craft are dead and only the "service" remains. Here was no deliberate Belsen bestiality; on the contrary, the medical personnel were carrying out their rotten technique under the illusion that it was good.

I do not wish to suggest that similar regression is likely in England; but the episode is nevertheless a reminder that the care and well-being of medicine rests solely in the hands of the doctors. No-one except doctors themselves can minister to this service, simply because medical wisdom is found only among medical men. This point has taken on a real importance today and needs stressing, even at the risk of giving offence or exposing ourselves to misunderstanding. Though the State has medical advisers (all of one colour), it is not really interested in medicine as such—only in the medical organisation which it is committed to launch.

At any time now our profession will be caught up in this organisation. Soon we shall become a part of the whole, and the great problem is how, under these circumstances, to remain professionally free. Laymen sometimes think this can easily be achieved, or, alternatively, that failure would not matter very much. Sometimes they show a misconception of the situation by saying in effect "the State service may be worse for you but it will be better for us." Which of course is absurd, because doctors and patients must sink or swim together. Medicine organised by the State was certainly not better for those patients in the German hospital, and organisation in England will improve on present conditions only if doctors as well as patients stay free. Freedom, like health, can be lost almost before we are aware of it; for just as an insidious disease can advance under the cover of compensation, so we may become acclimatised to a progressive loss of freedom till decompensation suddenly sets in and closes the scene.

A State medical service is coming, and our powers to mould its form are limited. Bearing in mind the size of the job—the substitution of a natural growth by a plan—we must not hope for much. But if we can get a service in which clinical acumen has pride of place over administrative ability, and in which financial reward is in direct proportion to technical skill and ability to shoulder responsibility, then we shall have done much to safeguard our profession for the future.

Buxted, Sussex. W. R. E. HARRISON.

LOCAL ANÆSTHESIA OR ANALGESIA

SIR,—May I associate myself with the views of Dr. Cartwright in your last issue? Looking down the list of questions set for the diploma in anæsthetics it is interesting to note how, as time goes by, loosely worded terms such as *local anæsthesia* have hardened into the more accurate *local analgesia*. From this it would appear that the indiscriminate usage of the two terms is frowned upon in high places.

I am afraid that we must admit that folk concerned with the "clinical" side of medicine are prone to a looseness of nomenclature of which we are rather proud; and in this connexion it is interesting to note that while surgeons and neurologists refer to *hyperæsthesia* the physiologist calls it *hyperalgesia*.

London, W.1. A. H. GALLEY.

TETANUS

SIR,—All those concerned with the difficult problem of the ætiology of postoperative tetanus must have read with great interest the article by Robinson, McLeod, and Downie in your issue of Feb. 2. Whether dust in surgical theatres proves on further investigation to be an important source of postoperative tetanus or not, the part played by infected catgut should never be forgotten however infrequent we may believe such an occurrence to be. Following my paper [1] to the section of surgery of the Royal Society of Medicine on this subject in March, 1936, the Ministry of Health issued a memorandum [2] in which some particulars were given of 9 cases which I had recently investigated, 5 of them proving fatal, in all of which the evidence pointed very strongly to "home cured" catgut as the source of infection. So far as I can ascertain, this very undesirable practice of sterilising catgut in a hospital laboratory, which was fairly common at the time, has become much less common as the result of war-time conditions and the operations of the Emergency Medical Service. The practice may however have survived in places and might even be revived in the future. Moreover, though the greatest care is taken to ensure that commercial catgut made by licensees under the Therapeutic Substances Act is free from pathogenic micro-organisms, including tetanus spores, the possibility of such spores surviving can never be completely excluded in a material like catgut, in which the lengths tested might be sterile but other portions of the same batch might contain spores if some mistake had been made in the approved process of sterilisation.

It is therefore of great importance, as I have pointed out before, that hospitals should keep a record of the make and batch number of catgut used in all operations, so that if postoperative tetanus should occur samples from the suspected batch, which are always retained for a considerable time by the manufacturers, can be tested. The keeping of such records should not be difficult as, in accordance with the Therapeutic Substances (Amendment) Regulations, 1937, article 6, the licence number and the batch number must now be "indelibly marked

1. *Proc. R. Soc. Med.* 1936, **29** (Sect. Surg. 35).
2. Memorandum no. 199 Med., August, 1936.

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on the sealed container of the surgical ligature or suture or printed or written in indelible ink on a label enclosed therein"; so that if, as is often the practice, containers are removed from the packets and placed in an antiseptic solution in the operating-theatre for a considerable time before the operation, it would still be possible to note the necessary particulars at the time of operation.

Ministry of Health, London, S.W.1. WELDON DALRYMPLE-CHAMPNEYS.

INFUSION INTO THE INTERNAL SAPHENOUS VEIN

SIR,—I have had no experience of the "trocar and cannula" needle, which certainly removes the objection to the non-cutting-down method that the point of the needle is liable to perforate the vein wall or to injure it and cause early thrombosis; but I intend to use it in future in suitable cases.

However, one has to deal with many patients who have veins which can be neither seen nor felt and who need transfusions urgently. Possibly these could be dealt with by Dr. Muntarbhorn's method (Feb. 2) of cutting-down and inserting the "trocar and cannula" needle under direct vision. But even this could be difficult in a shocked patient with collapsed veins. The method I describe is quick, certain, and successful in such a case.

I should be interested to know whether the two patients to whom Miss Louden referred (Jan. 12) had had all the veins round both ankles and elbows cut and tied in an attempt to give one transfusion, or whether this occurred at different times. I have more than once seen several veins put out of action by an operator inexperienced in the cutting-down method; and this was one of the main reasons for describing the technique in such detail. Such a person is likely to be even more unsuccessful in inserting a needle by the "blind" method.

Again, I think only a person exceedingly adept and experienced could hope to insert a needle without cutting-down in such circumstances as a child with burns needing a plasma drip; in any case such a patient is usually so restless that before very long the needle would be pulled out. This is also the experience of the Glasgow Burns Unit who strongly recommend cutting-down and tying-in. I think this applies equally to any restless patient.

I have yet to meet a patient needing a transfusion who has presented difficulties through having had all his veins put out of action by previous transfusions. In any case, it would surely be advisable to choose a new vein rather than one into which a transfusion has already been given, whichever method has previously been employed. How long does a vein take to recanalise? Is it not likely to thrombose more quickly having been already thrombosed on a previous occasion?

I think there is a place for both methods—the "cutting-down" and the "blind" (with the trocar and the cannula needle); but certainly for all children and also for adults who need transfusion urgently, I would still recommend the technique I described, which requires no special skill or experience and which ensures success.

West Bromwich and District General Hospital. J. H. KIRKHAM Resident surgical officer.

THERAPEUTIC USE OF DECOMPRESSION CHAMBERS

SIR,—Many of us who have used air-decompression chambers for testing the reaction of aircrew to high altitudes have experienced the many phenomena associated with a lowering of the atmospheric pressure and the subsequent use of oxygen. Surely these physiological alterations could be made use of in a therapeutic manner—for example, in congestive heart failure with cyanosis, where the patient's metabolism is working in only half an atmosphere and yet he is getting pure oxygen; in the production of cerebral ischæmia in acute manics, or of acute shock in chronic psychoses; in the production of hypnosis, the interrogator wearing a B.L.B. oxygen mask. Its use in pulmonary tuberculosis, spontaneous pneumothorax, &c., should also be investigated.

There are many of these chambers which are now not being used throughout the country. Should not the Medical Research Council be approached with a view to their trial for therapeutic purposes?

London, N.W.6. C. M. H. ROTMAN.

Public Health

Smallpox from Returning Service Men

INFECTION brought into the country by returning Service men has lately been the cause of two cases of smallpox in Hampstead and one at Grays, Essex.

A R.A.M.C. officer who had been in contact with some smallpox cases in India came home by air in the middle of January. Three days after his arrival in Hampstead he developed a feverish illness, followed after a further interval by a mild eruption. His wife and daughter have since developed typical mild smallpox which has been confirmed by laboratory tests, and have been removed to an isolation hospital. Both had been vaccinated, though not recently. In Grays, a boy of 13 years, vaccinated in infancy, caught smallpox from an uncle, a R.A.M.C. sick-berth attendant, who had been in contact with a smallpox case on the ship which brought him home from the East. Soon after he landed, the uncle had had a very mild attack of smallpox, which at the time passed for influenza. The boy has been isolated. In neither place have any further cases appeared up to the present.

The *Empress of India*, carrying 3000 Service men among her 4000 passengers, landed two cases of smallpox when she arrived in the Mersey from Bombay on Feb. 18. One was a member of the crew and the other a child. During the voyage three of the crew had developed smallpox and been put ashore at Suez, and all the passengers had been vaccinated. In cases of this kind the medical officers of health of all districts to which contacts are going will be sent their names and addresses. This is not done for air passengers, but those who have been in contact with infectious diseases are given a card with the necessary medical details to show to a doctor if they fall ill.

Infectious Disease in England and Wales

WEEK ENDED FEB. 2.—*Notifications.* Infectious disease: smallpox, 0; scarlet fever, 1351; whooping-cough, 1265; diphtheria, 496; paratyphoid, 2; typhoid, 7; measles (excluding rubella), 1167; pneumonia (primary or influenzal), 1794; cerebrospinal fever, 71; poliomyelitis, 13; polio-encephalitis, 2; encephalitis lethargica, 2; dysentery, 407; ophthalmia neonatorum, 54. No case of cholera or typhus was notified during the week.

The number of service and civilian sick in the Infectious Hospitals of the London County Council on Jan. 30 was 1089. During the previous week the following cases were admitted: scarlet fever, 75; diphtheria, 34; measles, 21; whooping-cough, 28.

Deaths.—In 126 great towns there were no deaths from enteric fever, 4 (1) from measles, 1 (0) from scarlet fever, 11 (0) from whooping-cough, 18 (0) from diphtheria, 39 (3) from diarrhœa and enteritis under two years, and 297 (48) from influenza. Figures in parentheses are those for London.

There were 3 deaths from whooping-cough at Norwich, Manchester and Stoke-on-Trent each reported 14 deaths from influenza, no other great town more than 10.

The number of stillbirths notified during the week was 214 (corresponding to a rate of 28 per thousand total births), including 28 in London.

WEEK ENDED FEB. 9.—*Notifications.* Infectious disease: smallpox, 0; scarlet fever, 1405; whooping-cough, 1253; diphtheria, 477; paratyphoid, 8; typhoid, 6; measles (excluding rubella), 1211; pneumonia (primary or influenzal), 1832; cerebrospinal fever, 98; poliomyelitis, 11; polio-encephalitis, 0; encephalitis lethargica, 4; dysentery, 337; ophthalmia neonatorum, 67. No case of cholera or typhus was notified during the week.

The number of service and civilian sick in the Infectious Hospitals of the London County Council on Feb. 5 was 1097. During the previous week the following cases were admitted: scarlet fever, 85; diphtheria, 34; measles, 19; whooping-cough, 27.

Deaths.—In 126 great towns there were no deaths from enteric fever or scarlet fever, 5 (0) from measles, 8 (1) from whooping-cough, 14 (1) from diphtheria, 48 (5) from diarrhœa and enteritis under two years, and 304 (49) from influenza.

Bolton reported 3 fatal cases of diphtheria. Birmingham had 15 deaths from influenza, Stoke-on-Trent 11, and Bristol 10.

The number of stillbirths notified during the week was 231 (corresponding to a rate of 30 per thousand total births), including 31 in London.

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Obituary

GEORGE WILLIAM BRAY

M.B. SYDNEY, M.R.C.P.

Dr. Bray died at his home in Hampstead on Feb. 12 t the early age of 44. A man of exceptional energy, e had for many years been accepted as an authority on llergic disorders, well known throughout the profession y his *Recent Advances in Allergy*, which first appeared n 1931.

Educated at Sydney, he qualified in 1925, and for a ime held the post of government medical officer on Nauru, an atoll in the Central Pacific, where he studied nutritional deficiencies. On coming to England he became house-physician and resident medical officer at the East London Hospital for Children, and then spent five years at the Hospital for Sick Children, Great Ormond Street, with a grant from the Halley Stewart trustees enabling him to investigate asthma. In the words of the late Sir Arthur Hurst, introducing the book which developed from these investigations, he had a "flair for research combined with hard work and clear thinking." When his scholarship came to an end he settled down in London as a consultant and

acquired a variety of appointments: he was physician o the Queen Elizabeth Hospital for Children, physician-n-charge of the allergy and children's departments at the Prince of Wales General Hospital, Tottenham, and consulting allergist to the Children's Hospital, Hampstead.

On his colleagues and many friends George Bray has eft the impression of a vivid personality. "It must be nearly twenty years ago," writes one of them, "that he came to Great Ormond Street to work at asthma—young, tremendously keen, dynamic, and never tired. He was a most temperate man, neither smoking nor drinking, but always tended to overwork. For the last few years of his life he knew that he had a high blood-pressure, but he burnt the candle at both ends in order to accomplish as much as he could in a short life, which he always said he would have. He was the most generous of people: as a host he was superb; he loved giving dinner parties, and no detail was neglected in order to make each of his guests happy. He was a great 'lodge' man and an enthusiastic, though not very proficient, golfer. He took a deep interest in stamps, and it will be found that his collection is quite first-class. All through the bombing and raids of London he remained at his work—attending his hospitals and to the duties of air-raid warden in addition, spending what time he could in the evenings with his stamps and what friends remained in London. He was a great family man; he adored his children—he would stop one in the street and read out the latest saying of his sons or daughter in Australia. If he had not been a doctor, I think perhaps he would have been a theatrical producer: he had vast numbers of theatrical friends whom he met partly through his work, but he managed to go to all the theatres and knew many of the leading actors and actresses, and was much beloved by them. The Actors' Benevolent Fund and various charity benefits owe much to George Bray. In peace-time he was a great traveller and amateur photographer. Whenever he went on holiday, he took his movie camera with him and visited some Continental capital or beauty spot, revelling in every moment. It is rare to meet a person who lives so fully, and he was kindness itself to all those about him. I do not remember his ever speaking ill of anyone."

JAMES WILMOT ADAMS

M.B. CAMB., F.R.C.S.

Mr. J. Wilmot Adams, who died at his home at Great Gransden, Beds, on Jan. 26, was for many years a surgeon in the Colonial Medical Service. Born in 1884, the son of Mr. James Adams, F.R.C.S., of Eastbourne, he was educated at Tonbridge School and Caius College, Cambridge. In 1908 he took the conjoint qualification from St. Bartholomew's Hospital, and many old Bart's men will remember Bill Adams's prowess on the football field Four years later he obtained his M.B., and in 1920 the F.R.C.S. After holding house-appointments at Bart's and at St. Mark's Hospital in London, he joined the Colonial Medical Service in 1913. He was posted to Malacca and later was for a long time senior surgeon at Penang. He retired shortly before the outbreak of war from his final appointment at Singapore. Mr. Adams married in 1913 Irene, youngest daughter of the late Dr. James Appleyard of Longford, Tasmania, and she survives him with two children.

WILLIAM CAMAC WILKINSON

B.A. SYDNEY, M.D. LOND., F.R.C.P.

Camac Wilkinson, who died on Feb. 2 at the age of 88, had made a reputation in two continents. He had a brilliant career as a student first in Sydney and then in London; he attained the rank of a consultant and lecturer in the University of Sydney, and when he settled in London he became one of the leading exponents of tuberculin therapy. After winning a scholarship and a gold medal in classics at Sydney he came to London to study medicine at University College Hospital, where he graduated M.B. with first-class honours in 1882. Two years later he obtained his M.D. and the M.R.C.P., and in 1902 he was elected F.R.C.P. Meanwhile, after post-graduate study at Strasbourg and Vienna, he had gone back to Sydney to become lecturer in medicine and pathology at the university and physician to the Royal Prince Alfred Hospital. In 1910 he returned to London, where he quickly established himself in consultant practice. He founded the tuberculin dispensary movement, and for many years he was director of the tuberculin dispensary in Nottingham Place.

As early as 1884 Wilkinson had visited Koch and had become inspired with his teaching. It was only natural therefore that when Koch introduced his original old tuberculin in 1890 Wilkinson should follow that dominating personality. Later, in 1901, Koch introduced "new tuberculin" and Wilkinson became one of the pioneers of tuberculin therapy, and for the rest of his working life he was an enthusiastic advocate of this treatment, preaching his doctrines in season and out, and collecting round him a band of devoted disciples to whom tuberculin therapy was almost a confession of faith. Perhaps it is due to the Wilkinson school more than to any other that tuberculin, though relegated to a short paragraph in modern textbooks, has never entirely died out. He elaborated a system of dosage on which he was most insistent—"dosage is the key to success" he wrote—and laid great stress on times and methods of inoculation. He confidently regarded the tuberculin dispensary as the best institution for carrying out the systematic investigation upon the prevalence and nature of tuberculosis. He advocated the establishment of 200 of these clinics in London alone and believed that in this way the need for sanatorium beds could be reduced to a minimum, with a corresponding saving to the national purse.

Wilkinson had indeed all the faith of an optimist and enthusiast and he never lost it, from his Parkes-Weber prize essay in 1909 to his swan-song, *Tuberculin, its Vindication by Technique*, published in 1933. It was combined, however, with a combative personality which seemed to thrive on opposition, and many were the battles royal between Wilkinson and his opponents in the years immediately before the first world war, when tuberculin therapy was one of the burning questions of medicine. Unfortunately this combative attitude obscured much that was sound in his general teaching apart from tuberculin, on which his critics might have agreed. For instance, in his *Principles of Immunity in Tuberculosis* he wrote:

"Tuberculosis, although a process of disease determined by the conflict between living units, is a rebel amongst diseases of its own class and a law unto itself. It does not conform to the rules that govern the other infectious processes. It has no known period of incubation. We cannot trace the disease to its actual source nor fix the time of its occurrence. It violates the usual principles of immunity obtaining in other infectious diseases, and revels in chronicity. Its very chronicity is the negation of absolute immunity and is respon-

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sible for the vagaries that make the diagnosis, prognosis and treatment such puzzling problems in practical medicine."

Like the artillery officer of the old school, Wilkinson believed that a war could be won with his one favourite weapon alone, and his death closes a chapter in the history of tuberculosis.

Dr. Wilkinson leaves a son and a daughter by his first wife, Miss Jessie Cruickshank. His second wife, who survives him, was Miss Dulcie Fry, of Sydney.

ELIZABETH STANTON

M.R.C.P.

Dr. Elizabeth O'Flynn's work as pathologist to the Queen Elizabeth Hospital for Children, Hackney, and earlier as assistant pathologist at the National Hospital, Queen Square, had brought her into contact with successions of young doctors with whom she generously shared her knowledge, and they will share her contemporaries' grief at her death. In 1930 she married the late Sir Thomas Stanton, then chief medical officer to the Colonial Secretary.

Taking the Conjoint in 1917, she obtained the M.R.C.P. six years later. The London School of Medicine for Women, Edinburgh, and St. George's Hospital had all contributed to her medical education. But it was St. George's that chiefly held her affection and where her outstanding qualities of mind were recognised and fostered by the late Sir James Collier, to whom she was house-physician and registrar. After serving as assistant clinical pathologist at King's College Hospital and as clinical assistant at the West End Hospital for Nervous Diseases, she was appointed assistant pathologist at Queen Square, and her published work on the calcium content of the cerebrospinal fluid and the hepatic aspect of lethargic encephalitis (with Critchley) and on subacute combined degeneration (with Greenfield) belonged to this period. Besides her appointment at the Queen's Hospital she was also pathologist to the Mothers' Hospital at Clapton.

Witty and with a great sense of fun, she was a delightful companion, whether in the enjoyment of plays, music, pictures, and books, or in some light-hearted escapade. G. K. T. recalls the occasion when she lent one of her dresses for a residents' Christmas entertainment "knowing well that it would be used for a libellous burlesque of herself which she enjoyed more than anyone else who saw it." Always ready to help her junior colleagues, she was never too busy to be bothered with questions as long as the questioner showed interest and enthusiasm. Miss Kinloch Beck writes: "No name suited her better than Betty O'Flynn, for she was Irish to her finger-tips, a gay rebel and beloved as such. The best and happiest years of her life were those of her marriage, and her husband's death in 1938 was a grievous blow. But she courageously continued at work, still took a vigorous part in discussion, and withstood the bombing of London with fortitude." She died on Feb. 1.

HUGH WANSEY BAYLY

M.C., M.A. CAMB., M.R.C.S.

Hugh Wansey Bayly was educated at Clare College, Cambridge, and qualified in 1900 from St. George's Hospital. He never completed his Cambridge degrees, as immediately after qualifying he enlisted with typical impetuosity in the Imperial Yeomanry, and went out to the South African War as a trooper. Later, as a civil surgeon, he gained the Queen's medal with four clasps. He came home in 1902 and held house-appointments at the West London Hospital and at the Children's Hospital, Great Ormond Street. Then for some three years he buried himself in an obscure general practice in Hoxton, till in 1906 he suddenly decided to go to sea as a ship's doctor. He is credited with having done the first successful operation for duodenal ulcer when at sea. He had always had a bent for pathology, and the following year he returned to St. George's Hospital as assistant to Dr. Spitta, and became pathologist to the Lock Hospital. It was at the Lock and at Queen Square he developed his interest in venereal disease, and the late sequelæ of syphilis.

Just before the outbreak of the 1914–18 war, when the question of Home Rule for Ireland became acute, and Lord Carson was declaring vehemently "Ulster will fight and Ulster will be right," Bayly helped to organise a provisional medical service for the Ulster Volunteers, in case of civil war, which luckily was never needed. In 1914 he joined the Navy but soon transferred to the Army, where, attached to the Scots Guards, he was twice wounded. On his return to practice in 1919 he founded with the late Lord Willoughby de Broke the Society for the Prevention of Venereal Diseases, and he ran it successfully for nearly twenty years. He practised as a venereologist till 1939, varying his activities by standing twice unsuccessfully for Parliament. When war broke out, he volunteered again at the age of 65 and served as surgeon in H.M.T. *Ettrick*. But his health broke down and he retired in 1940, suffering from coronary thrombosis, of which he wrote an account in the *Practitioner* in 1941. He died on Feb. 6 at Great Snoring, in Norfolk.

As a technician Bayly was remarkably neat. He designed a needle for intravenous injection which revolutionised administration of arsenic. It is difficult to remember now that when this was first introduced the surgeon cut down on a vein, inserted a cannula, tied it in and gave, in 300 c.cm. of saline, the one injection of '606' that was to cure syphilis. Bayly's needle made this obsolete. A typical George's man, he wore his top hat and morning coat as to the manner born, even when he practised in the wilds of Hoxton. Essentially a pioneer, he was rapid, intolerant of control, quixotic, lovable, and very irritating in turn. He was married three times.

J. J. A.

THE LATE DR. WINGFIELD

R. C. recalls that Dr. Wingfield, a heavyweight boxer in his student days, was a big man who matured early both physically and mentally. "With his fringe of snow-white hair topped by a shining bald pate, his serene and ruddy countenance, and his intense but kindly blue eyes, his physical appearance did not change much in twenty years, so that a young lady who came under his care when he was still under 40 told her relations that she had been examined by an old man. And 'the old man' or 'father' he was to those of us who went through the Frimley regime, initiated by Marcus Paterson and ably carried on and amplified by his successor. To see patients felling trees and sawing wood or digging in the garden, and to savour the spirit of cheerfulness and content that pervaded Frimley, was a tonic to the newcomer and gave the direct lie to the usual picture of sanatorium life. But there was no stereotyped procedure; every facet, social and economic as well as medical, of each individual patient was carefully assessed before Wingfield gave his deliberate judgment about treatment and prognosis. Many of his aphorisms became bywords in the sanatorium: to an over-anxious patient, 'You are only cured of tuberculosis when you die of something else'; and to an eager young man anxious to get back to long-distance cycling, 'Do as I do—sit on your bottom whenever you can.' He taught us that tuberculosis was not incompatible with a useful if regulated life, and the many poitrinaires who for years have visited him at Frimley every 2–3 months must have given him much encouragement in his work. Certainly we drew much comfort from these visits: the X-ray, the pleasant chat, the philosophical remarks on life, and the practical advice about our difficulties or ailments sent us away reassured and confident that we could carry on until the next visit was due."

C. G. L. writes: "I was a student in Wingfield's department at St. Thomas's in 1914 and have watched him from the patient's and friend's angles since. One could easily write a perfectly true but rather undiscerning notice about him—a wise physician whose very presence gave confidence, the Olympian who retained the common friendly touch, the beloved and trusted leader of threatened lives—all that is true but only surface true. His appearance was deceptive. He looked like the very best type of Roman emperor (or perhaps English squire would be better) and talked like a benign uncle, yet he had a boxer's out-of-the-ring uncombativeness, a physically big man's shyness, and he was at times a solitary. That, I think, brings one to the intellectual core of the man—his questing and persistently questing mind. 'These little problems,' he wrote to me a few weeks ago referring to a tuberculous one, 'want five or ten years' watching.' I doubt whether any of his patients, who included many doctors, realised the

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amount of contemplation he brought to bear on their individual struggles. The general in *The Green Curve*, who during a great battle fished for trout far behind the lines in order to keep his generalship intact and perspective clear, has his counterpart in medicine. To get away from the incidental tragedies and the oppression of a locally unfavourable terrain, to see the mammal attacked by the protean fungus, the modus vivendi and the breaking down of it, in no two cases for quite the same reasons; tuberculosis as an upset balance rather than a disease—that is the sort of mental background, the stage scenery against which he saw individual cases in his solitary hours. But it is not the loss of any abstract quality that brings tears to my eyes."

Medical Diary

FEB. 24 TO MAR. 2

Monday, Feb. 25

ROYAL SOCIETY OF MEDICINE, 1, Wimpole Street, W.1
5 P.M. *Odontology.* Mr. M. A. Rushton: Pathological Conditions of the Mandible.

Tuesday, 26th

ROYAL SOCIETY OF MEDICINE AND SCIENTIFIC FILM ASSOCIATION: joint meeting
2.15 P.M. (1, Wimpole Street, W.1.) Place of Films in Medical Education.
MEDICAL SOCIETY OF LONDON, 11, Chandos Street, W.1
5.30 P.M. Dr. Anthony Feiling: Brachial and Sciatic Pain. (Lecture for demobilised.)

Wednesday, 27th

ROYAL INSTITUTE OF PUBLIC HEALTH AND HYGIENE, 28, Portland Place, W.1
3.30 P.M. Dr. C. P. Hay: Domestic Uses of D.D.T.

Thursday, 28th

ROYAL INSTITUTION, 21, Albemarle Street, W.1
5.15 P.M. Sir Henry Dale, F.R.S.: Chemical Transmitters of the Effects of Nervous Impulses. (First of four weekly lectures.)
ROYAL SOCIETY OF MEDICINE
8 P.M. *Urology.* Mr. H. G. Hanley: The Female Urethra and its Relationship to Upper Urinary Tract Infections.
EDINBURGH POSTGRADUATE LECTURES
4.30 P.M. (Royal Infirmary.) Mr. J. J. M. Brown: Experience at a Centre for Blood-vessel Injuries during the Italian Campaign. (Honyman Gillespie lecture.)

Friday, March 1

ROYAL INSTITUTION
5.15 P.M. Prof. H. Hartridge, F.R.S.: Acoustic Control of the Flight of Bats.
ROYAL SOCIETY OF MEDICINE
10.30 A.M. *Otology.* Dr. Honor Smith, Prof. Hugh Cairns: Penicillin in Otogenic Meningitis.
2.30 P.M. *Laryngology.* Wing-Commander Maxwell Ellis, Surgeon Captain Macdonald Critchley: Idiopathic Recurrent Laryngeal Nerve Palsies.
5.30 P.M. *Anæsthetics.* Dr. T. Cecil Gray, Dr. John Halton: A Milestone in Anæsthesia? (*d*-tubocurarine chloride).
MEDICAL SOCIETY OF LONDON
5.30 P.M. Dr. Geoffrey Marshall: The Pneumonias. (Lecture for demobilised.)

Births, Marriages, and Deaths

BIRTHS

ANDREWS.—On Feb. 10, in London, Dr. Margot Andrews (née Joad), the wife of Peter Greenhill Andrews—a son.
ELLMAN.—On Feb. 10, the wife of Dr. Philip Ellman, of Leatherhead—a daughter.
FRAZER.—On Feb. 6, in London, the wife of Dr. W. Fitzgerald Frazer—a son.
LUNN.—On Feb. 12, at Oxford, Dr. Ina Lunn (née Currie), the wife of Captain G. M. Lunn—a daughter.
PARSONS.—On Jan. 16, in Dublin, the wife of Dr. A. D. Parsons, M.C.—a daughter.
ROGAN.—On Feb. 12, at Edinburgh, the wife of Dr. John Rogan—a daughter.
TATE.—On Feb. 8, the wife of Dr. H. T. Tate, of Mansfield—a son.
WRIGHT.—On Feb. 6, at Coventry, the wife of Dr. H. J. Wright—a daughter.

MARRIAGES

COOPER—FULTON.—On Feb. 13, at Edinburgh, Donald Martin Cooper, B.D., M.TH., to Jessie Ross McCutcheon Fulton, M.B.
DIXON—BAYLEY.—On Feb. 14, George Edward Dixon, M.B., to Nancy Elizabeth Bayley.

DEATHS

BRAY.—On Feb. 12, in London, George William Bray, M.B. Sydney M.R.C.P.
PRINGLE.—On Feb. 12, John Alexander Pringle, M.D. Dubl., of Canterbury, Kent, aged 63.
SHARPLEY.—On Feb. 13, at Broadway, Worcs, Christopher Wilfred Sharpley, M.R.C.S.
WRIGHT.—On Feb. 12, Thomas Wright, M.B. Glasg., formerly of Aldershot and Lee-on-the-Solent, aged 77.

Notes and News

MEDICAL ODYSSEY

AFTER the war in Spain a number of doctors of various nationalities who had served in the Spanish Republican Army were among the refugees interned—often under bad conditions—in France. At the same time China was in great need of medical help, and early in 1939 the Medical Aid to China Committee, composed mostly of medical men and women, succeeded in rescuing some of these doctors, sending them to China fully equipped and paying them a living wage. A Norwegian committee was working on the same lines, and altogether 19 men were sent out. They settled down well, learnt the language, and did excellent work in conditions difficult and unhealthy. After the fall of Norway the English committee took on the care of the whole 19, and with increasing trouble in remitting money the responsibility became onerous. Then the United (now British United) Aid to China Fund was established, and, though the committee retained its identity, its resources and collections were pooled with the fund, which was able to help the men more effectively.

With the defeat of Japan the problem of return to Europe arose, and it proved almost insoluble; passages, visas, passports presented endless obstacles, for the men comprised Poles, Czechs, Austrians, and Germans. Fortunately 7 had been adopted by the American-Chinese army in Burma, and when fighting ceased the Americans shipped them to Europe and they reached their native lands. One of the team had found employment for himself, but 11 still remained. Then the news came that UNRRA had enrolled them in its organisation, and better helpers could hardly be found.

The long wanderings of these men seem now to be coming to an end, and the committee have perhaps saved their lives; for if they had been left in the concentration camp they might not have survived the overrunning of France. So it was with some self-satisfaction that on Feb. 13 the committee held its last meeting. The members made a presentation to Dr. Mary Gilchrist, the hon. secretary, who had shouldered most of the work. The British United Aid to China organisation was thanked for the help given when it was most needed, and the hope was expressed that it would continue to receive the support of the committee's old subscribers.

NATIONAL INSTITUTE OF HOUSE WORKERS

THE Minister of Labour has announced the Government's decision to set up at once on an experimental basis a National Institute of House Workers as recommended in the Markham-Hancock report. Workers trained at the institute, and others with satisfactory qualifications, will be given certificates of efficiency, and in coöperation with the employment exchanges the institute will place them with employers or with the home-help services which the local authorities are now building up. At a few centres the institute will also run a staff of regular workers available on an hourly basis to housewives who do not want full-time help. The Government hopes that the new institute will attract more workers to domestic employment and thus help to relieve the shortage of domestic help in hospitals.

TRAINING OF THE ASSISTANT NURSE

THE rules for the training of the assistant nurse, which have been submitted to Parliament, have now been published by the General Nursing Council.[1] They are highly practical and would provide a good basic nursing training for any woman.

The theory in the syllabus has been kept commendably simple: the assistant nurse will be given a short review of the value of nursing to the community, the qualities needed in a recruit, the responsibility of the nurse towards people and property and the care of equipment, the effects of illness on the patient, and the layout of the hospital. She will be taught the elementary facts about the structure and functions of the body, the principles of nutrition, types of food and accessory food factors, the laws of healthy living in the community and the home, and the principles to be followed if health is to be maintained. On the practical side, however, she will learn a great deal, including the principles and methods of simple cookery and the preparation and serving of food; the principles and practice of first aid in the street, the home, the hospital; the handling and care of equipment; bed-making; blanket-bathing; the care of mouth, skin, hair, nails, hands, and feet; disinfestation; the care of helpless

1. Obtainable from the Registrar, G.N.C., 23, Portland Place, London, W.1. 1s.

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and incontinent patients; the prevention of bedsores; the giving and removing of bedpans; the taking of temperatures, and of pulse- and respiration-rates; charting; the feeding of helpless patients; the giving of medicines and their custody; the technique of hypodermic injection; the collection of specimens; the testing of urines; and the writing of reports. She will also learn special nursing procedures, including how to give enemas, apply poultices, and administer oxygen. She will be taught surgical cleanliness and surgical nursing care, the principles of asepsis and antisepsis, scrubbing-up, and how to do simple dressings.

These and other nursing duties, coupled with a knowledge of the main features of disease, and with some special training in diseases of social importance, should make of the assistant nurse the capable woman on whom our nursing service should be firmly based. The General Nursing Council is to be congratulated on formulating a syllabus which is practical without being in any sense narrow or stultifying. It is a pity that the woman who takes such a training is not to be dignified with the unequivocal title of nurse, and that as things stand at present the assistant-nursing qualification will not advance the girl who decides, after admission to the roll, that she would like to gain the register.

University of Oxford

In a congregation on Feb. 12, approval was given to the appointment of Dr. R. H. S. Thompson as dean of the medical school from Feb. 1 to Oct. 1, 1946.

University of Cambridge

Courses for demobilised medical officers.—Fourteen-day refresher courses in general medicine will be held at Southend-on-Sea General Hospital, beginning on April 1, and at Addenbrooke's Hospital, Cambridge, in July. A fortnight's course in social and industrial medicine will be held at Luton in May. Those seeking accommodation during the Southend course should apply to the hospital secretary. General practitioners may attend these courses if vacancies occur. Forms of entry may be obtained from Dr. Douglas Firth, Trinity Hall, Cambridge.

Regius chair of physic.—To give the regius professor more time for the organisation of the school of clinical research it has been decided to make his chair a whole-time appointment without the right to private practice. The stipend of £1350 a year will be supplemented by an allowance of £650.

University College, London

Mr. J. Z. Young, F.R.S., will deliver his inaugural lecture as professor of anatomy on Thursday, Feb. 28, at 5.15 P.M. His subject will be Patterns of Substance and Activity in the Nervous System.

University of Liverpool

Dr. H. L. Sheehan, director of research at the Glasgow Royal Maternity Hospital, has been appointed to the George Holt chair of pathology in the university.

Dr. Sheehan, who is 45 years of age, graduated M.B. with honours at Manchester in 1921 and was awarded the gold medal for his M.D. thesis in 1931. He has held a Rockefeller medical fellowship, and before going to Glasgow was for several years lecturer in pathology at the University of Manchester. He took his D.SC. in 1940 and the M.R.C.P. the following year. Besides his appointment at the Royal Maternity Hospital, Dr. Sheehan is consultant pathologist to the Royal Samaritan Hospital for Women and honorary lecturer in pathology at the University of Glasgow. He has written on medullary necrosis of the kidney, on postpartum necrosis of the pituitary, and blood-transfusion for obstetrical hæmorrhage. During the war, in which he has served as lieut.-colonel, R.A.M.C., he investigated the bacteriology of impetigo, and in 1944 presented observations from the Mediterranean theatre incriminating syringes as a vehicle for the transmission of infective hepatitis.

University of Dublin

The senate is to confer the honorary degree of SC.D. on Sir Alexander Fleming, F.R.S., and the honorary degree of M.D. on Sir Herbert Eason.

National University of Ireland

The degree of M.D. on published work has been awarded to Dr. P. N. Meenan (University College, Dublin).

Dr. Edward Doherty has been appointed lecturer in otology and rhino-laryngology.

Return to Practice

The Central Medical War Committee announces that the following have resumed civilian practice:—

Mr. A. W. BADENOCH, F.R.C.S., 110, Harley Street, W.1.
Dr. R. MASON BOLAM, 11, Sydenham Terrace, Newcastle-upon-Tyne.
Dr. E. H. HUDSON, F.R.C.P., 135, Harley Street, W.1.
Dr. H. W. A. POST, 121, Harley Street, W.1.
Mr. R. W. RAVEN, F.R.C.S., 14, Harley Street, W.1.
Mr. H. TREISSMAN, F.R.C.S., 5, Devonshire Place, W.1.

Royal College of Surgeons of England

At an ordinary meeting of the council, held on Feb. 14, with Sir Alfred Webb-Johnson, the president, in the chair, Dr. E. Ashworth Underwood was appointed Thomas Vicary lecturer for 1946.

The Hallett prize was awarded to Mr. Rameash Nigam of the University of Lucknow.

Sir Heneage Ogilvie and Mr. L. E. C. Norbury were reappointed as representative members of the council of the Imperial Cancer Research Fund, and Mr. Eardley Holland was re-elected as the representative of the college on the Central Midwives Board.

Mr. Hedley Whyte, Mr. J. B. Oldham, Mr. M. F. Nicholls, and Mr. Harold C. Edwards were re-elected members, and Mr. Julian Taylor was elected a member of the court of examiners.

Diplomas of membership and diplomas in public health were granted to the candidates named in the report of the comitia of the Royal College of Physicians in our issue of Feb. 9.

Books from the library, which were removed during the war to Ludlow, Worcester, and the National Library of Wales, have now been returned, and are being rearranged. The main library was not seriously damaged when the building was bombed, and the reading-room has been reopened.

Medical Society of London

The society's 166th anniversary dinner will be held at Claridge's Hotel on Friday, March 8.

Central Midwives Board

Following the death of Sir Comyns Berkeley, the board has elected Mr. Arnold Walker as chairman, and Mr. J. P. Hedley as vice-chairman, for the rest of the year ending on March 31.

Nutrition Society

A conference on nutrition in colonial territories will be held by the society on Saturday, March 2, at the London School of Hygiene. The society's hon. secretary is Mr. L. J. Harris, SC.D., Nutritional Laboratory, Milton Road, Cambridge.

Ward Orderlies for Middlesex

The public-health committee of the Middlesex County Council has decided to establish a new grade of hospital worker—the ward orderly—who will be paid 59*s.* 6*d.* a week, with uniform. London County Council have employed these orderlies for some years and "even under present conditions a certain number are obtainable." Besides replacing some of the present domestic assistants the orderlies would relieve the student nurses of some of their semi-domestic duties. Middlesex proposes to employ about 400 of these orderlies.

Nutrition Survey in Germany

The U.S. Army medical department is conducting an extensive nutritional survey in the American zone. About 20,000 civilians are physically examined and about 100,000 weighed each month. The survey is being made by six units (one in Austria), equipped with apparatus for testing hæmoglobin, blood protein, vitamin C, and other nutritional factors. In every city with a population of about 10,000, 5% of the population is weighed; this percentage is graduated down to about 0·5 in a city of 1,000,000. The nutritional physical examinations are made on a sampling basis to provide an accurate picture of different groups. The results of these studies are taken into account in estimating food requirements.

Appointments

BAINBRIDGE, Lieut.-Colonel CYRIL, O.B.E., M.B., B.HY. Durh.: temp. asst. M.O.H. for Northumberland.
CAMPBELL, R. J. C., M.B. Edin., D.M.R.: temp. asst. radiologist, Glasgow Royal Infirmary.
DILLON, FREDERICK, M.D. Edin.: physician in psychological medicine, University College Hospital, London.
GORDON-WILSON, C. G., M.R.C.P.; temp. asst. physician, St. Luke's Hospital, Guildford.
MARTIN, R. N., M.B. Belf., F.R.C.S.: senior orthopædic registrar, Norfolk and Norwich Hospital.
MAUTNER, FRANCIS, M.D. Prague: temp. asst. school M.O. for Halifax.
MORRIS, ROSE, M.B., D.P.H.: temp. asst. M.O.H. for Erith, Kent.

Colonial Medical Service.—The following appointments are announced:

BLAND, Major R. H., O.B.E., M.D. Dubl.: senior M.O., Palestine.
DICK, G. W. A., M.D. Edin.: pathologist, Uganda.
FITZMAURICE, L. W., M.D. McGill: D.M.S., Jamaica.
FRESHWATER, Lieut.-Colonel D. G., M.B.: venereologist, Nigeria.
HALL, A. H., M.D. Manitoba, F.R.C.S.E.: M.O., Gold Coast.
HENNESSEY, R. S. F., M.D. Dubl.: D.D.M.S., Palestine.
LESTER, H. M. O., O.B.E., PH.D. Lond., M.R.C.S.: D.M.S., Palestine.
MACKAY, Lieut.-Colonel D. H., M.R.C.S.: M.O., Kenya.
READ, Major M. T., M.R.C.S.: M.O., Nigeria.

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HEALTH CENTRES AND A CHILD-HEALTH SERVICE *

HELEN M. M. MACKAY
M.D. Lond., F.R.C.P.
PHYSICIAN TO THE QUEEN'S HOSPITAL FOR CHILDREN, HACKNEY, LONDON

SUCCESSIVE chief medical officers at the Ministry of Health and other public officials have set forth our achievements in the realm of child health; they have pointed with pride to our child-welfare service, our school medical service, and even perhaps occasionally to our voluntary children's hospitals and general-practitioner services. They have noted that our infant mortality has dropped in the last half-century to a third of what it was. Do we want any change in the organisation of our child-health services? Can't we be content to carry on in our good old ways, gradually extending our insurance medical service to include dependants of wage-earners?

I would ask any who may still be thinking on such lines to compare some mortality figures in this country and abroad. Here in Birmingham, thanks to the vision and energy of doctors and their lay collaborators, we have a rightly famous child-welfare service and voluntary children's hospital. But compare the probable fate of a newborn infant, just before the outbreak of war, in Birmingham and in Chicago, or in Glasgow and Amsterdam: his risk of dying before he was 12 months old was nearly twice as great in Birmingham as in Chicago; and nearly three times as great in Glasgow as in Amsterdam (McNeil 1943). It therefore seems that others have outstripped us in this field.

We have prided ourselves, at any rate, on our services for children in the lower-income groups. So let us look at mortality-rates in different economic classes in this country. The Registrar-General in his report for 1930–32 divided the population into five social and economic classes: class I professional, class III skilled manual workers, class V unskilled and casual workers, and lasses II and IV intermediate. Consider the child aged 12 months. His risk of dying before reaching the age of 2 years was five times greater if his father was an unskilled or casual labourer, and three times greater if his father was a skilled worker than if his father belonged to the professional class. His risk of dying from measles was actually about twenty times greater if his father was in class V than if his father was in class I (Gale 1945). Scarcely a source of pride: we must admit that our provision for the health of children is still far from satisfactory, and in some directions downright poor, and that great changes are required.

First and foremost we, as a people, must aim at improving the standard of living, as this is undoubtedly the biggest factor influencing child health. But that is not primarily a problem for doctors, though we should, as doctors, emphasise its importance. As I see it, our problem, as a profession, is fundamentally this: how can we provide children with parents, nurses, doctors, and administrators possessed of the knowledge and understanding necessary to give them the best chance of physical and mental health? In this field we lag behind some other countries. I regret that I have never seen the child-health services of Holland, but she certainly has a record to be proud of. An Australian doctor, who had studied medical work for children in Europe, told me that what struck her most forcibly in Holland was the knowledge of the essentials of child health, not only among doctors but also among nurses and the general public. The creation of such informed public opinion is one of the goals we should set ourselves.

* Delivered before the Medical Women's Federation at Birmingham on Oct. 5, 1945.

STUDENT AND PRACTITIONER

This brings me to the training of doctors. About a third of general practice, I am told, is concerned with children, and in many countries pædiatrics is one of the four main branches of the student's curriculum—i.e., medicine, surgery, obstetrics combined with gynæcology, and pædiatrics. In this country students have been able to qualify without having clerked in a children's ward and without examination by any physician accustomed to deal with children. Training the medical student in pædiatrics is perhaps the real key to progress in medical care for children, for it is the doctors who should teach nurses, parents, and lay administrators about the care of children, and without doctors who have a thorough grounding in pædiatrics—and that will take many years to achieve—no pædiatric service can be satisfactory.

But however good the undergraduate training, no man or woman can achieve the knowledge and skill to handle patients of all types competently; so in recent years groups of general practitioners have combined into firms, dividing the work among them according to their special training and skill. Even so, they lack all sorts of ancillary help and facilities which would assist both their patients and themselves—facilities too which would allow each doctor more time for his proper medical work. Such firms are the forerunners of the health centre, which I assume will be a group of general practitioners established in one building, where each will have his own consulting-room, and I hope waiting-room, and where the necessary ancillary accommodation and facilities for all will be shared. I assume that in a firm of eight or nine doctors in an urban area, at least three should possess postgraduate experience in the care of children: this will not debar other members of the firm from treating children, though naturally the bulk of the children's work would be done by those trained and interested in this branch. A general practitioner with a leaning towards pædiatrics might also have special competence in some other branch, perhaps obstetrics or anæsthetics, and would share in the general work of the group. For any such scheme to succeed, financial competition between the members of the team must be eliminated. The doctors at the centre could form a medical committee to consider all matters of common concern, including the allocation of duties among themselves.

ANCILLARY SERVICES

If doctors are to do their best work in the health centre, they must collaborate closely with others who are specially trained—nurses, pharmacists, almoners, and so on. Those of us who have worked with an almoner in the outpatient department of a children's hospital find it difficult to imagine dispensing with her help. She links the efforts of mother, doctor, teacher, convalescent home, local authority, and any other individual or body whose coöperation is necessary for the child. Probably even in the poorest districts one almoner could cope with three or four health centres; in many a weekly visit from the almoner might be enough.

Just as nurses are essential in a hospital outpatient department, so too they will be needed at the centre; just as they care for the patients in the hospital wards, so too they should undertake domiciliary work for patients attending the health centre. This means linking up district nurses with the centres. Nurses, like doctors, cannot be equally competent in all branches of their profession, so that some of those attached to the health centres should be State-registered sick children's nurses and some trained midwives with a knowledge of the newborn; and the work should be allocated so as to make the best use of all special knowledge. I should like to stress the importance of children's trained nurses in the care of sick children in their own homes. This would often obviate the necessity of

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admission to hospital with all its risks of cross-infection, its anxiety to the child, and the expense to the community.

If parents are to be taught about the care of their children, their willing coöperation must be enlisted. I have taught mothers both in welfare centres and in hospitals, and I have found that they are more receptive and more coöperative in hospital than in the welfare centre. That is only natural because the surest way of gaining a mother's confidence is to help her in the care of her sick child, or for her to see another child improving under one's charge. As children, if given half a chance, usually mend their own health, doctors and nurses engaged in treating sick children should have unrivalled opportunities of teaching the public, and their work should be organised to use this opportunity to the full.

The present arrangements for integrating and fusing the various services for child health satisfy no one. Those doctors in the public-health services who are engaged exclusively in rounds of welfare clinics or school inspections lose touch with all the stimulating advances in medicine, and never have the satisfaction of exercising their skill in the treatment of acutely ill patients; they have little opportunity and no encouragement to undertake investigations calculated to increase our knowledge of pædiatrics. In Birmingham, where the need of combining preventive and curative work is fully recognised, this is not so, and I believe all doctors in the child-welfare service share in the care of sick patients; but in many local-authority areas there is no such arrangement. Many of us consider that, under the National Health Service, a large part of the clinical work of the school and the child-welfare services, including nursing, could ultimately be done by the staff of the health centres. One doctor undertaking domiciliary work for children might be medical officer to a school, responsible for advising the headmaster on all medical matters, as well as for routine examinations of children and the supervision of phyiscal training. Another might undertake child-welfare clinics or a minor-ailment clinic. In the same way, no nurses should be exclusively employed as health visitors; they should be on the district nursing staff and share in the clinical work of the health centre. Naturally, evidence of suitable qualifications would be necessary for all the staff engaged primarily in dealing with children. In the case of doctors, the D.C.H., or an M.D. in pædiatrics, or evidence of good pædiatric experience should be demanded. I imagine many of the younger members of the child-welfare and school services would gladly qualify to undertake work at a health centre as pædiatric members of the team, and, as the change-over must obviously be gradual, there should be no displacement of older doctors engaged in the preventive services who did not wish for new work and new responsibilities.

Until now opportunities of earning a livelihood in pædiatrics have been very meagre: we urgently need doctors trained in this subject yet provide few real opportunities to those who have the leaning to treat sick children.

CHILDREN'S CLINIC AND HEALTH CENTRE

If doctors at the health centre take over public-health clinics the place where the clinics are habitually held need not necessarily be changed. Probably some health-centre buildings would include accommodation for children's clinics, but where good clinic accommodation already exists elsewhere it could still be used; and it is hoped that the establishment of health centres will not be postponed till new buildings are erected. The clinic accommodation, with waiting-rooms, weighing-rooms, and the like, should be so arranged that the children are not exposed to infection from patients coming to the doctors' surgeries. The question of cross-infection, that bugbear of children's hospitals and institutions, will need constant consideration in planning the centres, for among the sick children brought to them there are bound to be many cases of infection. To minimise these dangers I suggest that each doctor should have his own waiting-room as well as his own consulting-room and, when new building is possible, that each centre should contain a series of cubicles in charge of a receptionist, whose duty it would be to send all children likely to be infectious direct into a cubicle to be seen there by a doctor, and not into the general waiting-room.

This fusion of the curative and preventive services would in no way eliminate the need of keen and progressive medical administrators, who would certainly be required for organising clinics, nurseries, and school services, and for dealing with the allocation and training of staff and all the daily difficulties. The field of the administrator would be enlarged and would provide more opportunities and also more problems. Administrators would need both to shape policy and to let their policy be shaped by their fellow workers. But these administrators should have some clinical knowledge of the work; they should not be medical officers of health whose interests are centred elsewhere.

CHILDREN'S HOSPITALS

I am firmly convinced of the vital rôle of children's hospitals in relation to all this work. However well trained the health-centre staff, they must keep up to date and therefore in touch with specialists and specialist work. Some of the doctors at the centres should be attached also to the children's hospital, probably to the outpatient department; but this would be impossible for more than a small number. No doubt consultations over individual patients in their own homes will help to maintain contact, but, besides this, regular weekly consultations and demonstrations of selected cases might be arranged at the local children's hospital, and specialists and general practitioners should be invited to discuss diagnosis and treatment. If work at the centres is shared by different practitioners, it should be possible for those interested to attend these consultations.

It has been suggested that consultants should regularly attend the health centres, but I think that when a specialist opinion or special investigation is required, the child should normally come to the children's hospital. My reason is that the specialist also should not work in isolation, but should have the aid of his colleagues; and I believe he works best at his own hospital, where he is in touch with other pædiatricians, as well as with all the special departments. This does not, of course, preclude the specialist's going to see patients in their own homes or in general-practitioner hospitals.

A pædiatric club, open to all doctors engaged in the medical care of children, would I think be both popular and valuable, and would supply another means of post-graduate instruction as well as promoting coöperation. It should meet regularly, probably at the children's hospital.

INSTITUTES OF CHILD HEALTH

If the staff of the children's hospital are to train practitioners, then these specialists must have a knowledge of the preventive services, and should themselves undertake work in schools and welfare centres. But the children's hospital could not provide all the necessary postgraduate contacts and training for a really good pædiatric service. In every region there should, therefore, be one or more institutes of child health, and some such institutes are likely to be established in the near future. Each institute should be attached to a key children's hospital which is also a postgraduate teaching hospital. Hospital and institute should be on adjoining sites, and both should be linked with a

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maternity hospital, so that the problems of the neonatal period are not forgotten. The institute should also be closely linked with the university on the one hand and the regional or public-health authority on the other.

Institutes would not normally concern themselves with the treatment of the individual sick child: they should be centres for training and research in preventive medicine, the growth, development, and aptitudes of children, and in epidemiology; they should be the regional pædiatric centre—for example, medical advisory committees on child health, set up as part of the new health service, should meet there. Clinics for children whom it is not desired to bring into a hospital outpatient department, with its risks of infection, should be held there. Model welfare clinics, clinics for tuberculous contacts, psychiatric clinics, remedial exercise clinics, and so forth should be housed in the institute building, besides research and follow-up clinics for any special problems.

Information should be readily available at the institute concerning the health and infectious diseases of the area, so that clinicians may be kept alive to the problems of the public-health administrators, and may constantly see their work for individual patients in relation to a larger whole. Doctors and nurses, working in the different branches of pædiatrics, should look on the institute as the recognised centre for conferences on practical problems in child health, such as an epidemic in the local schools or neonatal mortality in the area; and courses of postgraduate training might be held there. The institute should also possess a good reference library.

The institute for child health should be staffed by specialists from the children's hospital, by administrative heads of the child-welfare and school medical services, by doctors and nurses engaged in clinical work in schools and welfare centres, and also by doctors and nurses in training for pædiatric work. Other specialists, such as obstetricians, epidemiologists, statisticians, and nutrition experts, should also be members or associate members of the staff. The specialist staff of the children's hospital, who are responsible for teaching, would gain from their contacts with the health administration, and the administrators could get help in their work from the specialists; and general practitioners engaged in pædiatric work should join with both in working out problems.

New prospects of research would be opened up. Suppose, for instance, a doctor at a health centre, who was also medical officer to a school, wished to carry out an investigation at the school and needed the help of a laboratory or other special service, such as a psychiatric or X-ray department, it should be possible for him to unite with other workers and for them jointly to bring their scheme to the notice, say, of a committee of the Medical Research Council. If this committee viewed it with favour, they would recommend that the practitioner be enabled to devote some of his time to the investigation. If the doctors at the health centre were paid by salary considerable elasticity should be possible in such matters once the present acute shortage of doctors is overcome. Or again research might be initiated from the other end: if a medical administrator or a medical or surgical specialist wished to follow up a special group of cases, the coöperation of selected clinicians at the centre might be invaluable, and the same machinery could make it possible for them to give time to the undertaking.

DISCUSSION

In the scheme I have outlined, which I do not claim as in any way original, the main medical care of children, including domiciliary work and group medicine in schools and welfare centre, would be done by doctors and nurses, attached to health centres, who are interested in, and have been specially trained for, this branch of medicine—a branch which offers the best prospects to the individual doctor of improving health. This change cannot be effected quickly, for we have not enough doctors and nurses trained for the work, but a start could be made immediately at experimental health centres. These doctors should possess postgraduate training in pædiatrics, and would be provided with opportunities of keeping their knowledge up to date by contacts with the key children's hospital and with the associated institute of child health. This institute would be linked both with the university and the local or regional authority and should form the centre of coöperation for all doctors and nurses engaged in service for children—as a place of training in preventive pædiatrics and as a place for increasing our understanding of child health. As knowledge of how to promote health involves knowledge of lack of health and of illness, I hope for the closest association between the children's hospital and the institute, as well as between pædiatricians, pædiatric general practitioners, pædiatric surgeons, obstetricians, children's nurses, and trained medical administrators.

I have talked of a utopia where lions and lambs, or, let us say, administrators and clinicians, lie down together. I have not told you how we are to reach this happy state, and I know it will not be easy; but we have plenty of idealism and plenty of common sense to help us. It is up to us to see the goal ourselves, and to get others to see it so that we may start on the way, even though the goal may not be reached in our life-time. The will exists to give children the best health we can, and the opportunity to reorganise and extend our medical services in their interest is upon us. May we, doctors and public, Government and profession, use it to the full.

References.—Gale, A. H. (1945) *Arch. Dis. Childh.* **20**, 2. McNeil, C. (1943) *Brit. med. J.* i, 715.

ACUTELY INFECTED PLEURAL EFFUSIONS

TECHNIQUES OF PENICILLIN TREATMENT

L. FATTI
F.R.C.S.
THORACIC SURGEON, HILLINGDON COUNTY HOSPITAL, UXBRIDGE

M. E. FLOREY *
M.B. Adelaide
RESEARCH CLINICAL ASSISTANT

H. JOULES
M.D. Lond., F.R.C.P.
MEDICAL DIRECTOR

J. H. HUMPHREY
M.B. Camb.
ASSISTANT PATHOLOGIST

J. SAKULA
M.D. Lond., M.R.C.P., D.C.H.
PÆDIATRICIAN
CENTRAL MIDDLESEX COUNTY HOSPITAL

THE techniques described below have been used with penicillin in the treatment of 24 acute infected pleural effusions: 14 while their pneumonic symptoms were still present and 10 after this phase had subsided. The success or failure of each technique was assessed by comparison of the results with those in a series of 14 controls, treated and observed from the pneumonic stage and taken in strictly alternate chronological order with the first group of the penicillin cases. These controls were treated along well-accepted lines, as the course of their condition indicated, so their results are a fair standard against which to measure those obtained with penicillin. For this purpose the duration of illness both from earliest pneumonic symptoms and from drainage till full healing in each penicillin case ("treated") was compared with the means of the controls, which were 15·0 and 11·6 weeks respectively.

The following criteria were then adopted. Any "treated" case taking as long as these means for full

* With a grant from the Medical Research Council.

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healing was considered a "failure." Treatment was accounted "successful" only when the duration was less than the shortest time taken by any of the controls—i.e., 8·5 weeks from earliest pneumonic symptom, and 5 weeks from drainage (control cases 1 and 14). "Partial success" is defined in the text.

ASPIRATIONS FOLLOWED BY INJECTIONS OF PENICILLIN

There were 7 cases: 2 pneumococcal, 2 staphylococcal, and 3 streptococcal. The results were: 2 successes, 1 partial success, and 4 failures.

The 2 successes were with interlobar collections of not more than 2 oz. One was a purulent staphylococcal effusion in a very ill child aged 7 years (case 1) and the other a pneumococcal collection in a man aged 40, six weeks after the onset of his pneumonic symptoms (case 15). Both received injections following aspiration every second day, till no further fluid could be aspirated, the treatment lasting eleven and seven days respectively. Though no exact end-point can be gauged in these cases, their erythrocyte-sedimentation rates had fallen from the region of 90 to under 20 per hour (Westergren) within 3½ weeks of first treatment, and both patients were then up and feeling well. The benefit of starting treatment early was demonstrated by the fact that the total duration of illness, till no further fluid could be aspirated, in the seriously ill case was 4 weeks, whereas the long preliminary period before treatment was begun in the second lengthened his illness to 8½ weeks.

"Partial success" was recorded in one large streptococcal effusion where no attempt was made to aspirate the full contents of the pleural cavity (case 2). Here thickening of the fluid did not develop to an appreciable extent; but, though sterilisation of the fluid, elimination of gram-positive cocci, and apyrexia were secured by the end of seven days, the functional result was not satisfactory. Fluid persisted for about six weeks, and flattening of the chest, with diminished expansion, remained obvious for many months.

The 4 failures (cases 3, 8, 12, and 13) were in infections with each of the three types of bacteria. They were large empyemata in which the originally thin fluid thickened so considerably that aspiration was almost impossible.

Though the effusions were sterile on culture and lessened considerably in amount, pyrexia persisted, and the time—2½–3½ weeks—during which this treatment was persisted in enabled a firm cavity with resistant walls to form, preventing full lung expansion. Three were subsequently drained.

A death took place in this group in an infant aged 3 months (case 3). The child already had anasarca when first treated on its 8th day of illness. It died suddenly at the end of a week's treatment, after some progress appeared to have been made, and at autopsy multiple staphylococcal lung abscesses and fibrinous pericarditis were found.

This method was abandoned early in the series except for small interlobar effusions which could be completely emptied by aspiration.

RIB-RESECTION

There were 3 cases: 2 due to hæmolytic and 1 due to anaerobic streptococci. All 3 were failures.

Two of the rib-resections followed aspiration and injection of penicillin (cases 12 and 13), and one followed intercostal drainage of one loculus of a multiloculated empyema (case 14). In every instance at the time rib-resection was carried out the pus was sterile on culture.

Penicillin therapy was not continued immediately in 2 cases. In case 13 the wound was sewn up round a Tudor Edwards tube, and further local administration alternating with drainage continued. All 3 cases became secondarily infected with *Staph. aureus* after treatment had been discontinued. The suppurating sinuses of 2 cases (12 and 13) were subsequently packed daily with gauze soaked in penicillin paste till wound swabs became sterile. The sinus mouths were then covered with a dry dressing—without drainage tube—and left rigorously alone for a week. By this time their mouths were closed and no further recurrence took place. Case 14 was treated along the same lines as the controls, but his sinus took eight weeks longer to heal than did those of the two other cases.

The total lengths of illness and time from drainage were of the same order as those of the controls. This method of treatment was abandoned completely as soon as it was realised how badly these cases were progressing compared with others treated by the methods subsequently described.

INTERCOSTAL DRAINAGE AND INSTILLATION OF PENICILLIN

There were 10 cases: 7 pneumococcal, 2 staphylococcal, and 1 anaerobic streptococcal. The results were: 7 successes, 2 partial successes, and 1 failure. This method depended on the alternate use of the intercostal tube for drainage and for instillation of penicillin.

The 2 cases in which there was partial success had to have subsequent aspirations after healing had taken place—of sterile pus and of fluid containing *Bact. coli* respectively. In one case the drainage was at fault, in the other, a patient aged 61 with auricular fibrillation and well-marked scoliosis, the inability of the lung to expand and fill the residual space favoured the collection of exudate (cases 23 and 18).

The only failure (case 14) was associated with faulty technique, a multiloculated empyema being drained from one loculus only. Rib-resection was carried out eventually. Two later similar cases have been treated successfully by draining each separate loculus either synchronously or consecutively.

All these cases, except the failure, were healed in 6–7½ weeks from first symptoms and 2–4½ weeks from drainage. This method was found most suitable for localised empyemata; there was little risk of collapse of the lung at this stage, and emptying of the cavity was far more effective than by aspiration, once the exudate had thickened.

ASPIRATIONS AND INJECTIONS WITH SUBSEQUENT INTERCOSTAL DRAINAGE

There were 8 cases: 6 pneumococcal, 1 staphylococcal, and 1 pneumococcal and non-hæmolytic streptococcal. The results were: 7 successes, 1 partial success, and no failures.

In this group aspiration and injection were carried out for a preliminary period followed by an intercostal drain when the exudate thickened. The time during which aspiration was carried out varied, but it was realised, before the investigation was completed, that it had been unnecessarily long in most cases. These cases were healed in 5–8·5 weeks from first symptoms and 2–4½ from drainage, except the partial success in a child aged 4 years who developed Sönne dysentery and whose treatment was interrupted for a fortnight.

This method of treatment was found eminently suitable for the effusions first treated in the toxæmic phase—in other words, it was the method of choice for all cases, provided they were detected and treated early enough, because in these the lung expanded readily, obliterating the cavity, and there was no loculation of fluid.

Techniques Recommended

The evolution of the final techniques depended on the discovery during the investigation of the following basic findings.

For the "treated" series:

(1) That injection of a large enough dose of penicillin into the pleural effusion would not only ensure treatment of the local condition, but also provide a systemic concentration for periods of 24–48 hours, according to the size of the dose given: 120,000–240,000 units for adults, 1000 units per pound of body-weight per 24 hours for children under 5 years (Florey and Heatley 1945).

(2) That sterile cultures from pneumococcal and streptococcal effusions were by no means a reliable guide to the elimination of infection and thus an indication for cessation of treatment. Films from which gram-positive cocci had entirely disappeared were of very much greater value in this connexion. Study of the changes taking place in films was the most reliable early guide to progress in the control of infection (Fatti et al. 1946).

(3) Radiological evidence, apart from definite fluid levels, was not a sole criterion on which to rely for the discontinuance of drainage (Fatti et al. 1946).

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For both series:

(4) That the risk of secondary infection of the pleural cavity following surgical drainage was considerable, and that it was a factor in prolonging suppuration and healing time (Fatti et al. 1946).

The most satisfactory techniques used were those described below.

THIN EFFUSIONS IN THE TOXÆMIC PHASE

When exploration for fluid is first carried out, penicillin is placed, ready for use, on the dressing-trolley.

Aspiration is carried out when fluid is found and as much as possible is removed without distressing the patient, the last 10 c.cm. being reserved for bacteriological examination.

Penicillin 240,000 *units* (or 2000 units per lb. body-weight in children under 5 years) in 20 c.cm. of saline is injected into the cavity slowly, care being taken to see whether the patient coughs up any yellow stained sputum as evidence of a bronchopleural fistula. The injection is done without waiting for the bacteriological report; but, if the report indicates that the fluid is infected, treatment is repeated every second day till the effusion is frankly purulent.

An *intercostal drain* is then inserted at the most suitable site for drainage. An incision is made in the skin only, and a trocar and cannula are used for penetrating the pleural cavity, so that the insertion shall be as airtight as possible.

The method of replacing the trocar by a drainage tube is demonstrated in fig. 1, its efficacy depending on the use of a drainage tube which exactly fits the bore of the cannula. No suture is employed, as this tends to cause some sloughing, and the tube may need readjustment later so that its mouth is at the correct level to ensure complete emptying of the cavity. If many fibrin clots frequently block the tube, the cavity is washed out with saline, but this is only done in the theatre, where every aseptic precaution can be observed. The use of a sucker often obviates the necessity of a washout and appears to be the most effective method of emptying the cavity. The cavity is left to drain under a water-seal over night, if the patient has passed the toxæmic stage. If not, an instillation is given as soon as all pus appears to have been removed (fig. 2).

Instillations following drainage are given into the tube twice a day, after the tube has been disconnected from the drainage system. Care is taken to pinch or clip the tube before disconnexion, to prevent any ingress of air. A solution containing 500 units of penicillin per c.cm. is sufficient if the toxæmic phase is past, as is usual in pneumococcal and streptococcal infections. The volume instilled is half the amount of discharge that has drained away, up to a maximum of 20 c.cm. This injunction depends on the ensurance of free drainage. For staphylococcal infections a systemic dose of 60,000 units is instilled twice daily, or the equivalent of 500 units per lb. body-weight in children under 5 years. The 24-hour dose is divided in two to compromise with the necessity for draining. After instillation a spigot is placed in the mouth of the drainage tube, and the tube is strapped to the chest wall (figs. 3 and 4).

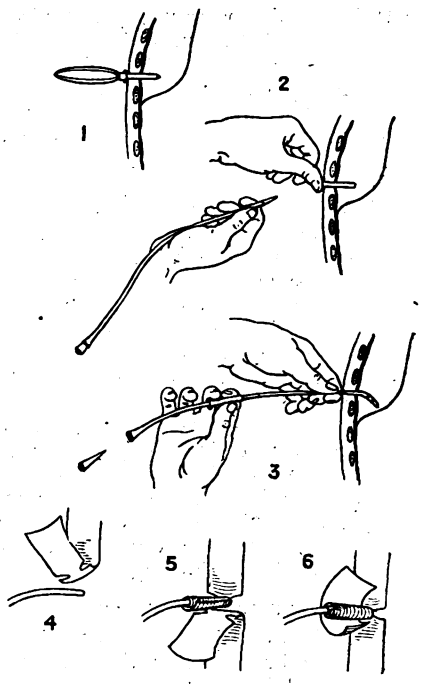

Fig. 1—Method of setting up intercostal drainage: (1) trocar and cannula inserted into pleural cavity through small incision through skin and subcutaneous tissues; (2) mouth of cannula blocked with thumb till well-fitting drainage tube is inserted while spigoted; (3) removal of cannula while air is prevented from entering pleural cavity by firmly gripping tube close to chest wall; (4) 'Elastoplast' cut to fit round and attach tube to chest wall; (5) second strip cut similarly: (6) third strip to hold the other two firm on tube. Tubes attached in this way have remained in situ 10 days in patients who were not restless.

Drainage is set up twice a day by connecting with the underwater system an hour before each instillation. Usually, unless the tube has become blocked, the whole amount that drains is expelled in 10 minutes, but the longer period is recommended as being safer.

A *radiogram* is taken on the day after insertion of the intercostal drain, to find out whether the tube is in the right position, and whether there is any residual effusion in the cavity. The radiogram should be taken after the cavity has been drained and not while the instilled penicillin is still in situ. Even 10 c.cm. makes a distinct shadow on the film and may simulate a much larger collection if the cavity is reduced in size and flat anteroposteriorly.

Discontinuance of drainage and instillation is indicated when the pus has disappeared and the discharge is serous or only slightly turbid and watery. *Three serial bacteriological examinations* at this stage are made on separate days. If all three are free from gram-positive cocci both in film and culture, the drainage tube is removed, a final instillation up the sinus being made as it is withdrawn.

A *dry dressing* is then placed over the mouth of the sinus. It is fixed firmly in place and left strictly alone for 5–7 days, by which time the wound should be dry.

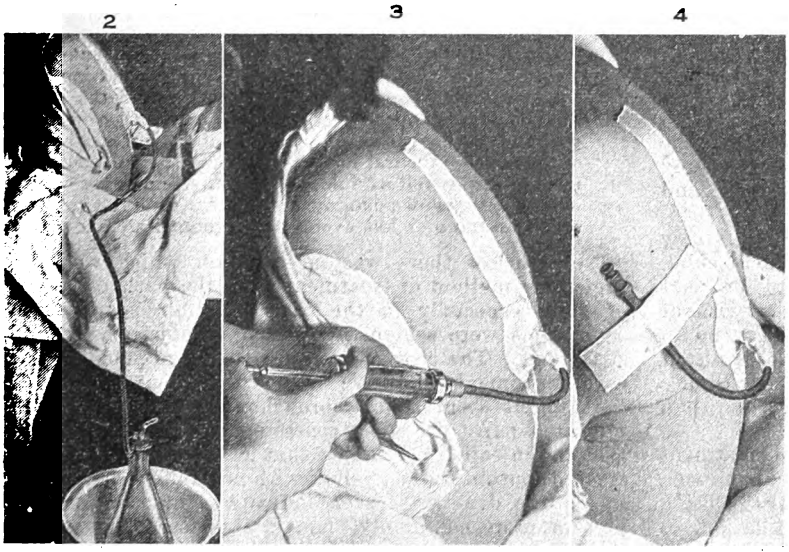

Fig. 2—Intercostal tube connected with underwater drainage system. This lasts an hour.

Fig. 3—Injection of penicillin after disconnexion of tube from drainage system. Nozzle of syringe fits into adaptor to accommodate it to bore of tube.

Fig. 4—Position of tube attached to chest wall after injection of penicillin. This is maintained for 11 hours.

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If it remains wet or the granulations pout, a further bacteriological examination is advisable, as a secondary invader may have infected the sinus track and need immediate treatment by instillation.

Breathing exercises are begun the day after drainage has been set up, and the patient is constantly urged to practise them frequently and not only when the physiotherapist is there to instruct him. Great emphasis is laid on this part of the treatment because, with so small an outlet as an intercostal drain, drainage requires to be actively assisted, and because, at the relatively early stage at which these effusions are drained, the lung is usually expansile enough to obliterate the cavity even in the 10–14 days during which drainage is carried out.

Washouts should be avoided unless there is such a mass of fibrin present that the tube is constantly getting blocked. If they must be used, an aseptic technique as rigorous as that used in the theatre must be adopted to avoid secondary infection by penicillin-insensitive organisms.

If these procedures are followed, the period of aspiration and injection lasts about a week, drainage 10–14 days, and full healing of the sinus another week or 10 days, the total duration of treatment from first detection till full healing being 4–6 weeks.

EFFUSIONS WHICH ARE ALREADY PURULENT

Purulent effusions are best drained immediately, before the fluid becomes too thick to pass readily down the intercostal drainage tube. In pneumococcal cases, if the effusion is not diagnosed until it is frankly purulent, the probability is that infection has passed its acute phase, and a dose of penicillin (500 units per c.cm.) producing only a local effect has been found sufficient. In the staphylococcal cases, however, the patients are very toxæmic and require a systemic dose (60,000 units twice daily).

SMALL CAVITIES

When the cavity is small and bounded by the yielding walls of an interlobar space, treatment by aspiration and injection alone has proved sufficient. Emptying of such a space by this means is possible, but it is seldom so when the effusion extends down to the diaphragm and is largely bounded by the resistant outer wall of the chest. Aspirations are carried out every second day, this being as often as most patients can face them with equanimity. A systemic dose is administered (240,000 units), for without the help of daily drainage it is necessary to ensure constant bacteriostasis in and around the walls of the cavity as well as in the effusion itself. The indications for discontinuing treatment are those already described.

Discussion

Papers have already been published describing the treatment of empyema with penicillin (Florey and Florey 1943, Keefer et al. 1943, Tillet et al. 1944, Bennett and Parkes 1944, Lockwood et al. 1944, Butler et al. 1944, Herrell and Kennedy 1944, Roberts et al. 1945, Healy and Katz 1945, Rudensky et al. 1945, Hirshfeld et al. 1945). The consensus of opinion seems to be that aspiration and injection with penicillin, with or without simultaneous intramuscular injections, may clear up an empyema, but that the pleural thickening and resultant diminished respiratory reserve following long persistence in this treatment cannot be overcome by other than standard methods of surgical treatment.

Roberts, Tubbs, and Bates (1945) attempted treatment by instillation after rib-resection, but this was abandoned as being ineffective. Hirshfeld and others (1945), using an intercostal drain, also abandoned instillation of penicillin after a week's treatment. d'Abreu and his colleagues (1944), however, described the satisfactory use of instillation alternating with intercostal drainage in a case of pyopneumothorax as a preliminary to removal of an intrathoracic foreign body. The purpose of this paper is to demonstrate that a technique can be used which combines effectively two essentials of treatment of an infected effusion—the use of an antibacterial agent and drainage—and causes minimal discomfort to the patient.

The standard set for successful treatment was high, but 18 of the 20 cases treated along the lines recommended came up to it—in other words, none of the 14 cases treated by standard methods of drainage alone was healed in so short a time as any of these. Though the stage at which an effusion was detected and treated by aspiration or drainage varied from 1 to 3½ weeks after earliest pneumonic symptoms, undoubtedly the earlier the effusion was detected and penicillin treatment started the shorter the total duration of illness. There is good reason to hope that the figures in the accompanying table can be reduced as soon as this is commonly realised and cases are not only treated at the earliest possible moment after fluid is detected, but also are referred early to the surgeon. These points need to be emphasised, for there is no indication that chronic empyemata which have persisted for a year or more will respond to the treatment outlined here. More radical surgical measures are then undoubtedly required, and it is to avoid these that the surgeon should take over as soon as the intercostal drain is indicated.

The choice of dosage was regulated by two considerations:

(1) The necessity for maintaining a bacteriostatic concentration in all tissues that might be infected beyond the immediate vicinity of the pleural exudate—i.e., 240,000 units every 48 hours or their equivalent for shorter periods.
(2) The desire to find the smallest dose compatible with good effects. With supplies of penicillin steadily mounting, the second consideration should be of academic rather than practical consequence in the future. There is no necessity, except for reasons of economy, to reduce the dose at any time, but it is well to remember that, once the infection is well localised, so small a dose as 5000 units twice daily, combined with good technique, will effect the same results as one twelve times it size.

Aspiration was preferred to drainage for two reasons:

(1) That with aspiration continuous retention of the drug was assured, and so systemic treatment could be more satisfactorily carried out. Instillation of systemic doses via an intercostal tube did not produce bacteriostatic levels in the blood-stream for such constant periods as did this method. This may have been due to some waste or to some of the dose being retained within the tube and so not being absorbed.
(2) That, no matter how carefully the intercostal tube was inserted, the frequent interference for instillation and connexion with the drainage system favoured the introduction of air and the collapse of lung, and prevented the fluid instilled from coming in contact with the whole of the affected pleural surfaces. Aspiration can effectively remove air as well as fluid, so that any remaining cavity will fill with its own exudate and so distribute the injected penicillin more or less evenly throughout its extent.

Nevertheless there was no question which was the preferable method of treatment from the patient's point of view, especially in the case of children on whom aspirations were seldom performed without crying and struggling. The change-over was therefore made at the earliest moment conducive to good treatment.

It might seem that a bronchopleural fistula would militate against the effectiveness of treatment by aspiration and injection. The fact that in 9 out of the 24 cases treated sputum stained yellow with penicillin was coughed up as the drug was given indicated that fistulæ are present more commonly than is supposed. In spite of them the treatment was effective. Injections given more frequently than once in 48 hours might be recommended in these patients, who may cough up a fair proportion of the drug and so not maintain continuous bacteriostasis in the blood-stream.

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RESULTS WITH DIFFERENT TECHNIQUES

Method of treatment	Controls							Treated with penicillin						
					Duration (weeks)							Duration (weeks)		
	Case no.	Age (yr.)	Size of effusion (oz.)	Infecting organism	Symptoms before detection	Onset to healed	Drainage to healed	Case no.*	Age (yr.)	Size of effusion (oz.)	Infecting organism	Symptoms before treated	Onset to healed	Drainage to healed
Aspiration only ..	1	52	2	Pneum.	3·5	8·5	..	1	7	1	*S. aur.*	1	4	..
								2	37	20	H. strep.	3	7·5	..
								15	40	2	Pneum.	7	8·5	..
								3	3/12	1·5	*S. aur.*	1	Died	..
Intercostal drainage following aspiration	2	12	26	*S. aur.*	1	11	10	4	1	2	*S. aur.*	1	5·5	2
								16	74	5	Pneum.	1·5	5	3·5
								5	46	15	Pneum.	1·5	7	4·5
								6	6	5	N.-h. strep. and pneum.	1·5	7·5	3·
								7	64	14	Pneum.	1·5	8·5	4·5
								17	47	14	Pneum.	2	6	2·5
								8	52	22	Pneum.	2	8	3·5
								9	4	?	Pneum.	2·5	10	7·5
Intercostal drainage only	3	7	12	Pneum.	2·5	10·5	7·5	10	3·5	5	*S. aur.*	2	6	4
								11	31	2	Pneum.	2	6·5	4·5
								18	61	34	Pneum.	3	6‡	3
								19	4	2	Pneum.	3·5	7	3·5
								20	8	2	*S. aur.*	3·5	6·5	3
								21	74	6+6	Pneum.	3·5	7·5§	4
								22	7	8	Pneum.	4	7	3
								23	40	10	Pneum.	4·5	7·5‡	2
								24	40	3	Pneum.	4·5	7·5	3
Rib-resection:														
after aspiration	4	7	40	Pneum.	1	>63	>60	12	53	20	H. strep.	1·5	13	10
	5	42	15	Pneum.	1·5	10	6	13	21	20	H. strep.	2	17	11·5
after aspiration and intercostal drainage	6	16	26	H. strep.	2	15·5	12	..	..	..	..	..	..	..
	7	39	40	?†	2	15	11·5	..	..	..	..	..	..	..
	8	46	14	N.-h. strep.	2·5	23	18	..	..	..	..	..	..	..
after intercostal drainage	9	1	1	Pneum.	1·5	>17	>12	14	43	15	Anaer. strep.	2·5	22‖	19·5
	10	6	32	H. strep.	1·5	24	22·5	..	..	..	..	..	..	..
	11	27	38	H. strep.	2·5	23	20·5	..	..	..	..	..	..	..
rib-resection alone	12	13	4	*S. aur.*	1	15	8	..	..	..	..	..	..	..
	13	32	5	Pneum.	2	12	6	..	..	..	..	..	..	..
	14	6	?	Pneum.	2·5	10	5	..	..	..	..	..	..	..
Means¶	..	..	..	..	..	15·0	11·6	..	..	..	..	..	7	3·6
Standard deviations ..	..	..	..	..	..	±4·94	±5·77	..	..	..	..	..	±1·34	±1·26

* Nos. 1–14 treated alternately with controls. † Gram-positive and gram-negative cocci and bacilli in films, but culture sterile.
‡ 2 subsequent aspirations before chest cleared. § 2 loculi drained consecutively.
‖ Multilocular empyema not drained from each loculus before treatment discontinued.
¶ Case 4 excluded from controls because of error in treatment, case 3 from "treated" because of untreated attendant exudative pericarditis, and cases 12, 13, and 14 because surgical treatment not recommended.

Even when the effusions were not located—a circumstance which every experienced clinician knows is by no means uncommon—injections were made into the pleural space, though no appreciable fluid was withdrawn. These had a well-marked effect on the toxæmic signs, though they did not prevent the effusion from eventually becoming purulent and requiring drainage.

The hope that early use of the drug might prevent the formation of pus was not borne out by the facts. Only one "treated" effusion did not become frankly purulent. The constancy with which pus appeared without any attendant well-marked leucocytosis might have led to the inference that an irritating effect was exerted on the pleuræ. Repeated injections, however, into the pleural cavities of guineapigs and rabbits of the same preparations as were used clinically produced no local reaction whatever.

The continual danger of superadded infection by gram-positive organisms, once drainage had been set up, compelled us to continue with penicillin till no further interference with the wound was necessary. The poor results following rib-resection, where pyogenic secondary infection invariably developed both in controls and "treated," were ascribed to the much freer entry offered to invading bacteria. The large surface of the pleural walls thus exposed provided a ground on which these invaders could readily establish themselves. It is well known that a pneumococcal empyema can heal up seven weeks after rib-resection, and it is a legitimate inference, from the time these organisms take to disappear, that many such empyemata should heal in this time, provided no other infection supervenes. Though the "treated" rib-resection cases were listed as failures, so small a number as 3 would not be sufficient to rule this combination of treatment out of court, but they are a warning to surgeons that, if they carry out rib-resection in the interests of efficient drainage, the risk of secondary infection will be considerably increased. It is suggested that this secondary invasion is responsible for the usual long period after rib-resection before healing takes place.

Superadded infection by gram-negative organisms appeared to have more of a nuisance value than serious consequences. That it can be avoided by a careful dressing technique was demonstrated by a subsequent case treated in a ward otherwise full of battle casualties, every one of whose wounds harboured up to three of the common gram-negative invaders. This patient was treated entirely in this ward, but his cavity, once sterilised, remained so till full healing had taken place.

The sterility on culture of the pus was not an indication for discontinuing drainage. Its unreliability as a criterion was explained partly by the argument that dead and disintegrating matter which has been cast off from inflamed tissues could not be expected to be an exact mirror of the presence of infection in the surrounding living tissues, and by the observation of Wright and others (1918), who described the inhibitory effect of pus on bacterial growth. In spite of this the continued presence of gram-positive cocci in the film rather than in the culture was a most valuable guide to the continuance of infection, and their disappearance to its elimination. (This phenomenon was also noted by Roberts, Tubbs, and Bates 1945.) The time for discontinuance of drainage was therefore based on this finding in combination with disappearance of pus and absence of fluid levels on radiography.

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The radiological findings were a source of considerable concern to the clinician. In some cases drainage was prolonged, fruitless explorations were performed after it had been discontinued, and rib-resection and even thoracoplasty considered on the strength of the residual shadows. But every case eventually completely cleared without any further surgical interference. This was the final justification for discontinuing drainage early and allowing the sinus to heal. Screening was of great help in distinguishing between thickened pleura and fluid during and after treatment. A plea is put forward here to regard screening as an essential factor in the treatment of empyemata not only for distinguishing fluid from pleural shadows but also as an aid in correctly siting the tube.

The one death in the whole group of cases fell in the "treated" series. The appearance of this child and the suddenness of its death pointed to the cause being heart-failure, but there was also no hope of treating the infected fluid in the pericardium other than by local instillation. This case therefore falls outside the range of clinical conditions which the treatment here prescribed can cover.

Finally it must be emphasised that careful technique was practised throughout. The finding of the effusion in the initial stages, the correct siting of the drainage tube, and the attention necessary for keeping the tube clear of clots without washouts and of preventing any air from entering into the cavity would not have been possible in unskilled hands. Nevertheless the short period of convalescence before the patient was able to take entire care of himself without needing even a dry dressing justified the intensive and experienced care given to him.

Summary

Techniques for the use of penicillin in the treatment of acute infections of the pleura are described, and results in 20 cases compared with those of a series of 14 controls treated by standard methods.

The result has been to reduce the mean duration of the illness from earliest pneumonic symptoms to complete healing from 15 to 7 weeks, and from drainage to healing from 11·6 to 3·6 weeks.

The technique depends on the use of aspirations and of injections of penicillin as soon as the effusion is recognised, followed, once it becomes purulent, by intercostal drainage alternating with instillation.

The choice of a systemic or local dose depends on whether or not the toxæmic phase is passed and the infection well localised.

The results have been obtained irrespective of the age of the patients or attendant pathological conditions, except exudative pericarditis, but they depend on careful and skilled technique.

We wish to thank Dr. Walter Pagel for his kindness in carrying out biological experiments for us; Dr. J. S. Bray and the laboratory staffs of both hospitals for the bacteriological examinations; the radiological and the nursing staffs for their unremitting help; Mr. R. M. N. Atherstone and Miss Barber for the illustrations; and Dr. M. A. Jennings for advice on the text.

REFERENCES

Bennett, T. I., Parkes, T. (1944) *Lancet*, i, 305.
Butler, E. C. B., Perry, K. M. A., Valentine, F. C. O. (1944) *Brit. med. J.* ii, 171.
d'Abreu, A. L., Litchfield, J. W., Thomson, S. (1944) *Brit. J. Surg.* **32**, 179.
Fatti, L., Florey, M. E., Joules, H., Humphrey, J. H., Sakula, J. (1946) *Lancet*, Feb. 23, p. 257.
Florey, M. E., Florey, H. W. (1943) *Ibid*, i, 387.
— Heatley, N. G. (1945) *Ibid*, i, 748.
Healy, M. J. jun., Katz, H. L. (1945) *J. Amer. med. Ass.* **128**, 568.
Herrell, W. E., Kennedy, R. L. J. (1944) *J. Pediat.* **25**, 505.
Hirshfeld, J. W., Buggs, C. W., Abbott, W. E., Pilling, M. A. (1945) *J. Amer. med. Ass.* **128**, 577.
Keefer, C. S., Blake, F. G., Marshall, E. K. jun., Lockwood, J. S., Wood, W. B. jun. (1943) *Ibid*, **122**, 1217.
Lockwood, J. S., White, W. L., Murphy, F. D. (1944) *Ann. Surg.* **120**, 311.
Roberts, J. E. H., Tubbs, O. S., Bates, M. (1945) *Lancet*, i, 39.
Rudensky, H., Sprong, D. H. jun., Woods, C. C. (1945) *J. Amer. med. Ass.* **128**, 573.
Tillet, W. S., Cambier, M. J., McCormack, J. E. (1944) *Bull. N.Y. Acad. Med.* **20**, 142.
Wright, Almroth E., Fleming, A., Colebrook, L. (1918) *Lancet*, i, 831.

HUMAN FERTILITY

C. SCOTT RUSSELL

M.A. Oxfd, M.B. Edin., F.R.C.S.E., M.R.C.O.G.

FIRST ASSISTANT, NUFFIELD DEPARTMENT OF OBSTETRICS AND GYNÆCOLOGY, UNIVERSITY OF OXFORD

IN his book, *The Natural History of Population*, Raymond Pearl discussed the case-records of 199 married couples, collected over a period of 12 years. This sample, which he considered "probably reasonably representative of American urban conditions," consisted of couples who were "not sterile," who had "never made any sort of contraceptive effort during their wedded lives," whose sexual habits "were reasonably constant," and whose "pregnancies and births experienced are correctly recorded." The information about the sexual habits of these people came primarily from the wife but was independently checked in many cases by separate interviews with the husband.

Pearl distinguished between total and net potentially effective coitus frequencies, the latter excluding coitus taking place while the woman is pregnant. He stated: "If only potentially effective copulations be considered there were of these, on the average, 254 for each pregnancy and 301 for each live birth." In a later article (Pearl 1940) the average monthly frequency of coitus of these couples is given as 10·5; so it appears that the women took, on the average, about 24 months to conceive. If his facts are as stated, and if the sample is accepted as representative, his conclusion "The relative sterility of the human organism is truly the marvel rather than fertility" must be acknowledged.

Clinical experience in England, however, does not support the view that women who have conceived have done so only with difficulty. Impressions are, however, notoriously misleading; so a short investigation was planned and initiated to obtain factual evidence concerning the ease with which conception takes place.

METHOD

A questionnaire was prepared to obtain the following details—age and number of conceptions; menstrual habit; age at time of each conception; duration and methods of birth-control (if practised) before conception; number of menstruations before conception *; approximate frequency of coitus at the time pregnancy was desired; whether pregnancy was planned or a "mistake"; any history of previous treatment for sterility; and in some cases the degree of sexual satisfaction experienced during coitus.

Patients attending antenatal, postnatal, and gynæcological clinics of the Radcliffe Infirmary, Oxford, were chosen for convenience. Only those who had conceived were interviewed; sterile married couples were excluded. A separate card was used for each conception. No record was kept of third and subsequent conceptions.

Just over 200 women were questioned. A few were such poor witnesses that a satisfactory record was not obtained; 197 were able and prepared to answer the questions. Some, indeed, because of their difficulties, were glad of the opportunity to discuss the intimate details of their married lives. Each woman was interviewed alone by me.

To get the quick coöperation of the woman questioned, she was told that her help was needed and why; that a few personal questions would be put, which, however, she was under no obligation to answer. Some explanation of the reason for the interview was essential for its

* If the husband was away for weeks at a time, this figure was adjusted accordingly. For example, a woman taking 9 months in all to conceive, but whose husband was on active service, getting home only for 10 days every 3 months, was considered to have conceived within 30 days—i.e., to have had only one menstruation.

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success and only fair to the women. Records of 197 first conceptions and 96 second conceptions are available.

NATURE OF SAMPLE

The group of women questioned was not a random sample. They were selected for fertility, because at least one conception had taken place in every case. Pearl's series was similarly selected. They may, however, be taken as fairly representative of the community attending antenatal, postnatal, and gynæcological clinics of British teaching hospitals during the war. Most of the cases came from antenatal and postnatal clinics, a fact which explains the preponderance of young women. The ages of the women at the time of questioning were as follows:

Under 20	20–24	25–29	30–34	35 *and over*
19	85	55	28	10

BIRTH-CONTROL

The following definition of birth-control (quoted from Marie Stopes) was adopted: "Contraception (birth-control) is the use by either sex of any means whatsoever whereby coitus (the act of union between man and woman) may be experienced, while at the same time the fusion of the ovum with the spermatozoa may be averted so that conception does not take place." All methods, including coitus interruptus and the use of the "safe period" but excluding abstinence, are therefore included.

One of the first observations made was that a considerable proportion of the women interviewed had conceived while attempting birth-control. The conceptions were mistakes. Further, the proportion of mistakes was considerably higher with second conceptions (28%) than with first (18%), a trend (table I) suggesting that

TABLE I—FREQUENCY OF UNSUCCESSFUL BIRTH-CONTROL

Pregnancy	Planned	Unplanned	Total
First ..	162	35 (*18%*)	197
Second ..	69	27 (*28%*)	96
Total ..	231	62	293

$\chi^2 = 3{\cdot}56$ (with Yates's correction). Probability between 0·05 and 0·1.

even after the birth of one child the parents were seriously trying to avoid or delay the arrival of a second.

The methods of birth-control varied considerably. Out of the 120 couples practising birth-control before the first conception, coitus interruptus was used by 72 (60%), condoms by 33 (28%), vaginal pessaries by 20 (17%), Dutch caps by 2, and douching and the use of the "safe period" by 1 each (it will be noticed that more than one method was used by 9 couples). Before a second pregnancy 78% of couples practising birth-control had used interrupted coitus, though of these 11 had used some other method also. One elderly woman had tried Beecham's pills (without success); and one younger woman got up after coitus, passed water, and coughed (with apparent success), a method told her by an old nurse.

Most of the women whose husbands were "careful" said that interrupted coitus was a satisfactory method of birth-control for them. Though few had tried other methods, this was rather surprising; so I questioned, towards the end of this study, a few of the women more closely and found two who were greatly upset by this form of birth-control. One woman, after weeks of interrupted coitus, had long fits of uncontrollable crying; another's nerves were so upset that she got herself a Dutch cap, which she found more satisfactory. In contrast, at least one woman preferred interrupted coitus to the use of a cap.

The unwitting use of the "safe period" by women anxious to conceive is illustrated by the following brief case-records.

Mrs. A., aged 34, conceived for the second time only after 10 years. She menstruated every 19–21 days, the period lasting 7–12 days. Presumably, therefore, ovulation was taking place before the menstrual discharge ceased, and at a time when coitus was unlikely. She thought that this explanation might well account for her relative sterility, especially as the last monthly period before the present pregnancy had lasted only 4 days—a unique event for her.

Mrs. B., aged 39, conceived for the second time after having waited for over 10 years. She menstruated every 19 days, the period lasting 6 days. Presumably, in her case too, ovulation was taking place before the menstrual discharge ceased and at a time when coitus was unlikely. When this was explained to her, she agreed that it might well account for her relative sterility, especially as, at the time of her last monthly period, coitus had taken place before the discharge ceased.

TABLE II—FREQUENCY OF BIRTH-CONTROL BEFORE CONCEPTION

Pregnancy	Previous contraception	No previous contraception	Total
First ..	120 (*61%*)	77	197
Second ..	60 (*63%*)	36	96
Total ..	180	113	293

Probability greater than 0·90.

In table II the frequency of previous birth-control is recorded for first and second conceptions (the incomplete records of 17 women have been included among those who had not used birth-control). The incidence of contraception before the first conception (61%) is not different from that between the first and second conceptions (63%). At first sight this lack of variation in contraceptive effort (table II) does not seem in keeping with the evidence (table I) that the proportion of mistaken first conceptions was considerably less than the corresponding proportion for second conceptions. When, however, the duration of successful birth-control before the first conception is compared with the duration before the second conception (table III) a possible cause of the

TABLE III—DURATION OF SUCCESSFUL BIRTH-CONTROL BEFORE FIRST AND BETWEEN FIRST AND SECOND CONCEPTIONS

—	Less than 2 yr	More than 2 yr	Total
Before first	52	31	83
Between first and second	6	23	29
Total	58	54	112

$\chi^2 = 13{\cdot}5$. Probability less than 0·001.

anomaly is apparent. Childless couples successfully practising birth-control did so for a much shorter time than those that had already successfully conceived. There was therefore a greater opportunity for "mistakes" in the latter group.

It must be emphasised that the observed frequency of birth-control refers only to the specified times studied—i.e., before the first and between the first and second conceptions. Though I do not have data on the subject, my impression is that the incidence of such control among women who have conceived twice or more is considerably higher than 60%.

RELATIVELY STERILE OR RELATIVELY FERTILE?

The main purpose of the present study was to obtain an estimate of how easily pregnant or parous women had conceived. Table IV shows that 35% of the pregnancies started immediately, there being no further menstruation; 30% occurred within 3 months; nearly 20% between 4 and 12 months; and 15% after more than a year

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(of these about half started after 3 years or later). *Nearly two-thirds of the pregnancies started within 3 months of natural coitus.* Only 5 women had received previous treatment for sterility. No difference between the rate of conception of first and second pregnancies can be detected from table IV. If, however, pairs of record-cards of women who had conceived twice—both pregnancies being planned—are analysed, a trend is at once apparent. Fifty-two such pairs were available. By subtracting in each case the number of menstruations before the second conception from the number before the first conception a difference column is obtained. The mean of this column is + 1·28 months, which is 2·47 times its standard error; this evidence therefore suggests that second pregnancies may be conceived slightly more easily than first pregnancies; there were, however, many exceptions to this trend.

TABLE IV—FREQUENCY DISTRIBUTION OF NUMBER OF MENSTRUATIONS BEFORE FIRST AND BEFORE SECOND CONCEPTION

Number of menstruations	First pregnancy	Second pregnancy	Total
0 ..	56	25	81 (35%)
1–3 ..	51	19	70 (30%)
4–12 ..	31	14	45 (20%)
13– ..	24	11	35 (15%)
Total ..	162	69	231

$\chi^2 = 0{\cdot}36$. Probability greater than 0·90.

No significant correlation between speed of conception and degree of sexual satisfaction could be demonstrated, though the trend was in the direction one would expect (table V).

TABLE V—DEGREE OF SEXUAL PLEASURE AND NUMBER OF MENSTRUATIONS BEFORE CONCEPTION

Number of menstruations	Satisfactory coitus	Some pleasure	No pleasure	Total
0 ..	47	17	10	74
1–6 ..	49	16	13	78
6– ..	25	10	16	51
Total ..	121	43	39	203

$\chi^2 = 6{\cdot}89$. $n = 4$. Probability between 0·1 and 0·2.

EFFECT OF PREVIOUS CONTRACEPTION

No significant difference was observed between the rate of conception in those who had previously practised birth-control and those who had not (table VI).

TABLE VI—EFFECT OF BIRTH-CONTROL ON THE SPEED OF CONCEPTION

Number of menstruations	Previous birth-control	No previous birth-control	Total
0 ..	49	32	81
1–3 ..	40	30	70
4–12 ..	30	15	45
13– ..	17	18	35
Total ..	136	95	231

$\chi^2 = 2{\cdot}84$. $n = 6$. Probability between 0·3 and 0·5.

DISCUSSION

This evidence suggests that women who conceive do so, on the whole, without much difficulty. Two-thirds of those questioned conceived within 3 months, a fact which does not support Pearl's conclusion that "the relative sterility of the human organism is the marvel rather than fertility." The women he describes must have taken, on the average, about 2 years to conceive. What is the explanation of these widely different results?

Although Pearl (1939) described his 199 couples as "probably reasonably representative" of American urban conditions, this view cannot pass unchallenged. Most of his book is concerned with the analysis of the record-cards of 30,949 women. From these cards he estimated the frequency of birth-control in white women as roughly 50%. How then can a sample of 199 couples, chosen among other reasons because the individuals never practised birth-control, be regarded as even "reasonably representative"? And if it is not representative, how could the author justify his conclusion?

The fact that the couples never practised birth-control suggests that they were so infertile that contraceptive effort was for them not necessary. Pearl, however, claimed that they were "surely highly fertile"; so this claim must also be considered. He wrote, "those at risk in the age period 20–29 produced an average of 3·3 pregnancies apiece in that period—an average spacing of 3 years between births; and those at risk in the age period 30–39 had in that period an average of 2·4 pregnancies apiece. Such performances denote relatively high fertility rather than low." The justification for his last sentence is obscure; indeed it is clear from a later article (Pearl 1940), in which he defended his conclusions, that this part of his work had already been subject to criticism. Admittedly he showed that there was no significant difference between the fertility—he spoke of "pregnancy rates per 100 years exposure"—of his special group of 199 non-contraceptors and of the much larger "moderate circumstances" non-contraceptor group; at first sight he therefore seems to justify his statement that "there appears to be no ground for concluding that the couples in the present sample were as a group characterised by abnormally low fertility." When, however, the method by which information was obtained about the practice of birth-control, in particular the incidence of coitus interruptus, is studied, it is at once apparent that a proportion of the women in his non-contraceptor groups may have been practising birth-control. If this was the case the above comparison immediately becomes invalid.

The data which he has described and discussed were collected according to a plan which in broad outline "was to have a simple but rather comprehensive history card filled out for each woman delivered of a baby in the obstetrical service of some hospital located in or near a large city east of the Mississippi River." So far as can be made out, the personnel filling up these cards consisted of "hospital interns, residents, and staff members"; presumably, therefore, the majority were inexperienced and junior members of the profession. A facsimile of the record-card, together with the instructions to medical personnel, is given in appendix 2 of his book. On the card the following questions and answers may be found:

"Has patient ever used any method of prevention of conception? YES. NO."

and with reference to this question the following instruction to medical personnel is given:

"If the patient has ever used any methods or method for the prevention of conception, or any methods which she used in the belief that they would produce such effect, draw a line about the word YES. If she has never used any such methods of any sort whatever, draw a line around the word NO in this space. In case the answer is YES, fuller details will be recorded on the other side of the card."

Later it is said:

"Do not accept a statement from the patient to the effect that she has never used any contraceptive method until by further questioning and study of her reproductive history in its entirety you are satisfied that her statement represents the real facts."

Only at first sight do such instructions appear adequate. It is clinical experience in this country—and there is no reason to expect a difference in the U.S.A.—that many

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women do not look on coitus interruptus as a form of birth-control; hence, even though this method is being practised, they will answer *No* to the question: "Have you used any method of prevention of conception?" When *No* is the answer it is always necessary to ask the further question: "Is your husband careful?" or "Does your husband withdraw?" Only then may the truth be apparent. The fact that this source of error has not been specifically explained in the instructions to the medical personnel filling in the history card is, in my opinion, such a serious omission that the whole of Pearl's data dealing with contraceptive effort must be suspect and the validity of all comparisons with such data seriously questioned.

In my investigation the incidence of coitus interruptus was 60% before the first conception and 78% between the first and second. In contrast Pearl (1934) has assessed the frequency of this form of birth-control as only 20% among white women and 9% among negroes. The considerable difference between these estimates confirms the opinion already stated that a substantial proportion of women practising interrupted coitus have been recorded by Pearl and his workers as not practising birth-control. If this criticism is accepted, the magnitude of possible error assumes alarming proportions.

SUMMARY AND CONCLUSIONS

According to Pearl "the relative sterility of the human organism is truly the marvel rather than fertility." This conclusion is based on the study of 199 couples who must have taken on the average about 24 months to conceive.

Because clinical experience in this country does not support this view, a short investigation was carried out with the main object of obtaining an estimate of the time taken to conceive.

Records of 197 first and 96 second conceptions have been obtained and analysed. Details of third and subsequent conceptions have not been recorded.

Nearly two-thirds of the pregnancies started within 3 months of natural coitus. This finding does not therefore confirm Pearl's conclusion.

A trend is apparent suggesting that second babies are conceived slightly more easily than first babies.

Two-thirds of the women interviewed practised birth-control before the first conception, and the same proportion practised it between the first and second conceptions.

Coitus interruptus was the usual method of birth-control.

The duration of successful contraception was significantly shorter in couples who had not conceived than in those who had conceived once.

The failure of birth-control was significantly greater between the first and second conceptions than before the first. The explanation may be either the longer duration of contraceptive effort or the increased use of interrupted coitus at that time.

No significant difference was demonstrated between the ease of conception in women who previously had and those who previously had not practised birth-control.

Pearl's data are criticised from two points of view: (1) the statement that his group of 199 couples is "reasonably representative" is questioned; (2) it is suggested that his method of obtaining accurate information about the practice of birth-control was so unsatisfactory that much of his data on this subject must be viewed with suspicion.

I wish to thank Dr. D. V. Glass and Prof. Chassar Moir for their help; the staff of the outpatient department of the maternity home, Radcliffe Infirmary; and, above all, the women who freely supplied the necessary information.

REFERENCES

Pearl, R. (1934) *Hum. Biol.* 6, 355.
— (1939) The Natural History of Population, London.
— (1940) *Hum. Biol.* 12, 545.

GROUP ANALYSIS IN A MILITARY NEUROSIS CENTRE

S. H. FOULKES
M.D. Frankfort, L.R.C.P.E.
MAJOR R.A.M.C., SPECIALIST IN PSYCHIATRY
From a Military Psychiatric Hospital

APART from the two extremes in which very strong predisposition or violent precipitating causes have brought about a breakdown, most psychiatric casualties in the Army are the result of conditions to which their units have been subjected. Good or bad handling by the Army as a whole, and more especially by the unit and sub-unit, decides how many men will sooner or later cease to function happily or at least adequately.

Once the soldier has become a casualty he loses contact with his comrades, officers, unit, and job. All sorts of problems in connexion with his home, civilian affairs, and his future, hitherto submerged, raise their heads afresh. Having escaped from hell once, many a soldier is not keen to return to it; and after a comparative rest from Army life and discipline he is afraid of facing them again. In the individual soldier the disturbance follows old ingrained patterns on symbolical lines: old traumas are revived; regression to old fixation levels of libido and ego development and to old modes of defence takes place. But if we allow ourselves to be fascinated by this individual view of behaviour we may not see the wood for the trees.

In all our patients there is evidence that their interpersonal relationships have been disturbed. A soldier who enters the hospital is a failure in three respects: (1) he has failed in his competence to perform his duties as a soldier and as a citizen of a community at war; (2) he represents a failure of the preventive mental hygiene of his unit and the therapeutic efforts of the psychiatric services so far; and (3) he is a failure in his own eyes. His belief in himself is shattered; he is isolated, out of contact and context with his fellows, disoriented to his present, and ill at ease over his allegiances and their conflicting claims. Deemed unfit to perform any useful function many neurotic soldiers miss the salutary participation in a concerted effort, even though they are glad to escape from it. Their mind is disturbed, their body refuses to function, sometimes the body-image shows signs of disruption. A host of complaints grows on this ground on top of a general state of apathy, hopelessness, and unwillingness. Many soldiers put it thus: "I am fed up," "I am browned off."

What can be done at this stage? How can treatment be directed? A man who has been mentally wounded needs time and conditions in which his wounds can heal and all possible assistance to encourage and expedite this process. He may need sedation, abreaction, suggestion and hypnosis, or short-cut analysis, with or without the help of drugs. He benefits from understanding and sympathy and may respond to some extent to encouragement, "pep" talks, and the like. All these methods and many more are potent tools in the right case at the right time and in the right context; but they cannot have any lasting effect unless the basic problem has been faced; and sometimes they may merely gloss over the salient problem.

AIM OF TREATMENT

Having in mind that the patient's stay in hospital is on an average 6–8 weeks, we cannot reasonably expect to alter the basic reaction pattern, nor can we undo completely the effects of the patient's experiences. But we can aim at restoring his self-confidence and his ability to do useful work and at improving his tolerance for the strains of Army life. The soldier's attitude must be corrected, and we must restore his ability to take interest

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in work and people, to become absorbed into the group and its task, and thus to be open to the wholesome influence of the group on him.

In all the individual methods mentioned above, even in those where obedient activity is demanded, the patient is essentially passive, yet he can be active in such a reorientation at every step from the moment he enters the hospital. In this way self-confidence and sense of value can best be restored, orientation and outlook revised, and adjustment towards others and the Army improved. The soldier can then accept more willingly his obligation to further service. To create activity and spontaneity is half the battle; and if this battle is won the healing process will largely look after itself.

The hospital should thus become not only the locus but also the primary medium for this therapeutic process, a new frame of reference in which a better social attitude can be developed. By his actions and reactions in his present unit, in his present world, in the hospital, we shall know him.

METHOD OF TREATMENT

It has been found possible within the framework of a military hospital so to arrange treatment that the emphasis throughout is on the *social* aspects of treatment and on the *spontaneity* of the group activities. Patients run ward meetings as far as possible by themselves, with the psychiatrist mainly in the rôle of observer. They select their own committee to represent the ward. These ward committees assemble once a week as a kind of parliament, when they debate the different complaints, proposals, and so on to help formulate hospital policy. Patients run their own hospital club. Their selected activities bring them into contact and coöperation with other patients. Inside this setting their changing behaviour can be observed and their situation manipulated in coöperation with the psychiatrist so as to have the maximal therapeutic effect on their condition. Preferably they should look on themselves as sharing in a common job of work, a so-called group project, so that they have a common aim.

Inside this framework they are taking part in group therapeutic sessions, the meaning and scope of which acquire a new significance. For this group therapy certain principles were developed from earlier experiences.[1] Essentially this experiment, carried out in civilian practice in 1941 and 1942, consisted in the free application of psycho-analytic principles to the treatment of groups, combined with intensive individual psychotherapy. It had been found possible to discuss and even analyse a wealth of material inside a group based on the free associations of these patients. This not only stimulated the individual patient but also intensified the therapeutic effect considerably. Moreover, the group situation, itself a potent therapeutic agent, brought into play a number of factors—such as exchange of information, the realisation of similar difficulties in others, and the double rôle of the patient in understanding others while benefiting from their understanding—which were peculiar to the group and had their own therapeutic effects. In this way group treatment showed itself to be of specific value apart from the economy in time.

This experience was used in the outpatient department of a clinic where group treatment replaced individual treatment almost entirely, and results were much better. The patients attended these group meetings weekly for various periods, but essentially the period of attendance was indefinite. In a military hospital time is limited, and as a rule is not sufficient to work through the deeper levels which this form of group psychotherapy tends to activate and lay bare. Further, most of the staff are not trained and experienced psycho-analysts and can therefore rarely embark on psycho-analysis. Nevertheless any knowledge and experience of psycho-analysis which the prospective group therapist possesses will be of good use to him. It will enable him better to understand and handle the reactions of the group. He will be less surprised by their transference reactions, negative or positive, or their resistances. He will be better able to bear anxieties and tensions and less taken aback by the varied claims which a group thrusts on him.

1. Foulkes, S. H., Lewis, E. *Brit. J. med. Psychol.* 1944, 20, 175.

While it was necessary to accept further considerable modifications, it was nevertheless found possible and useful to maintain the fundamental position. Such a group now consists of 7–9 people who assemble in an informal way in the psychiatrist's consulting-room, in the ward, or out of doors. The session varies in length between a minimum of an hour and a maximum of 2 hours. If the group meets more than once a week an hour is adequate; but for weekly sessions 1½ hours seems more appropriate. The psychiatrist combines the rôle of a conductor and observer with that of a member of the group. The patients in a group are told that they should bring forward anything they wish, and that they need not stick to any one point brought up but should continue to express anything which comes to their mind. They are sometimes given some initial explanations of how this helps their condition, but in general they are left to discover it all by themselves.

The therapist may have to be more active and talk more in the initial stage than later on. His function is to put people at their ease, encourage them to talk and exchange information and opinions, and help them to formulate and interpret their views, in which he acts as a kind of host and mediator. His primary aim is to get the group going as a whole, to provoke their interest, and generally to invite all-round participation before he attempts to delve deeper with any individual member. Even at this stage of initiation he may find it useful to keep up a reserve, to resist the temptations of helping too readily and of feeling under an obligation to entertain and interest the group actively on his own part. The sooner he refuses, gently, persistently, and without being provocative, to accept the position of a leader, the better he will succeed in throwing the onus of responsibility back on the group and helping their own spontaneous activity to emerge. In such a way the group learns to accept responsibility for everything happening within it or brought before it.

It is essential that the therapist's approach should be spontaneous and in accordance with the reality situation of the group and their mood at the current moment. It would therefore be more misleading than enlightening to try to give a standardised description of his technique. This can only be acquired in living contact with such groups. It would need a textbook to describe technique problems adequately and illustrate them with living examples. Topics brought forth in the group comprise the whole range of human experience; but every group will bring forth the most relevant of them and state their salient problems at any time, if only they are allowed sufficient liberty and spontaneity to do so.

ILLUSTRATIVE EXAMPLE

The following is an example of a typical well-conducted group session. It happened in one of the groups conducted by Captain George Day, R.A.M.C., who kindly put his record at my disposal.

Eight ex-prisoners-of-war, hitherto only on nodding acquaintance, are assembled in the psychiatrist's consulting-room. Cigarettes are lit, and there is an expectant pause. Silence. Then a corporal asks, "Can you explain, Sir, why I cry so easily at anything sentimental at the pictures nowadays? I used not to be like that." The psychiatrist does not answer directly but asks if other members have experienced the same change. There is a small murmur of agreement from four men, one of whom adds that nowadays he cannot stand music, although he used to love it. There are murmurs of

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agreement from others. The group is beginning to stir with mutual interest. The psychiatrist asks, "What other changes have you noticed in yourselves?" A sergeant volunteers that he finds his family getting on his nerves; he has to rush out of the sitting-room to avoid explosions of anger. Another man recalls that he slinks away upstairs when company arrives.

By now the members of the group are talking freely to each other; the psychiatrist has little to do but observe and show his interest. They become bolder. One confesses to an irresistible tendency to nag at his wife and snub his child; further, that he feels a savage satisfaction in doing it. Whereupon another slaps his thigh with a heartfelt, "By God, you're right. I do the same, but I never thought I'd admit it in public."

In this way, with growing confidence and lessening self-consciousness, the group compares notes not only of symptoms but also of ideals and ethical codes. There are, of course, irrelevancies, reminiscences, leg-pulls, and laughter. Most are talking freely. The psychiatrist unobtrusively conducts the group like an orchestra, drawing out the quieter voices, giving cues to the shy and hesitant, and preventing the extrovert from swamping the rest with his solos.

"We were so completely cut off from the world," reflects a corporal. A withdrawn private, who up to now has said nothing, suddenly blurts out, "We are still cut off." Coming from him, this remark raises a good-natured laugh, and he colours up; but one of the more thoughtful patients at once supports him and proceeds fumblingly to explain how. It is as if the P.O.W. had been caged not only behind barbed wire but also behind a wall he had built to protect himself from the realities of prison life. This concept is accepted with thoughtful nods . . . "Well, how is this barrier to be broken down?" They turn expectantly to the psychiatrist, who asks them what else they think they have been doing for the past hour, and judges this to be the right moment to end the session.

RESULTS ACHIEVED

By thus receding into the background the therapist can best observe the dynamics of the group and the interpersonal relations between its members besides fulfilling his real rôle of steering the group delicately towards a therapeutic end. One of the great advantages of such an approach is that the group is brought up against its own difficulties, resistances, and opposition; it rarely fails to realise that these are self-manufactured, and, under rising pressure of tension, it cannot in the long run avoid tackling them.

A group may clearly show to a psychopathic member that, whereas he is accepted by the group, his behaviour is not acceptable. In this respect, therefore, treatment is not only in a group but also of and through a group. Resistances have sometimes to be taken up and directed, brought to the fore, and made the main topic for a while or even for a whole session. This applies in particular when difficulties are bound up with the person of the therapist through transference. In dealing with this situation he must set an example to the group in abiding by the same rules as any other member. He must be frank, honest, and true to the situation.

The yoke of the Army falls heavily on all. When the psychiatrist has a fellow-feeling for those suffering under rough justice—the disappointed, and the misunderstood—he must be honest and show it. He cannot successfully simulate a tolerance he does not feel nor dissemble his shocked feelings when his own particular code is outraged. On the whole, the group is confronted with its own difficulties and obliged to deal with them itself.

Individual interviews arising out of the group session in turn gain greatly in value and purpose and are the more appreciated. They are valuable to supplement the group and sometimes necessary to deal with very personal problems. At the same time they are used to adjust the patient better to his particular group, and he can be encouraged to bring forth his points in the group session. This helps to eliminate unnecessary barriers which separate the patient not only from the particular group but also from the community at large and hold him to his neurosis.

A group session of this type is not didactic (as are some other forms of group therapy), nor is it primarily used for the direct treatment of symptoms by way of persuasion, reassurance, &c. It adheres to the principle of centring the group on itself, weaning it from its desire to be led, and even leaving it to find its own aim and purpose. Under these conditions a set of newly created forces spring to life. The group presents itself as a new object for observation and treatment—a new organism as it were, distinct from the individuals composing it. The therapist must appreciate and master these group dynamics and use them as levers to influence the individuals composing the group. If he can penetrate the surface and take the unconscious dynamics into account as well as bring them to light and into active interplay, he is a group analyst.

ADVANTAGES OF GROUP TREATMENT

The advantages of group treatment are manifold. They fall into three categories:

(1) *Practical.*—Economy of time, occasion to obtain and impart all sorts of information, &c. This need not be elaborated.

(2) *Clinical.*—By observing people in a quasi-real life situation it is possible to get to know them much better than in the artificial setting of the individual psychiatric interview. One can see what the patient's symptoms and complaints mean in reality, how they affect his behaviour, and how he is setting out to overcome his difficulties. Unexpected light is thrown on the patient's attitude, morale, coöperation, and powers of resilience and compensation. In this way the group situation helps to bring out finer psychodiagnostic points. Once some experience has been gained, it is possible, and sometimes even preferable, to see new patients together in a group before seeing them individually and thus to allow the first individual handling to arise from observations made in the group.

(3) *Therapeutic.*—The group approach appears to intensify and shorten therapy considerably; but, apart from this, there appear to be intrinsic factors operating in group treatment that are lacking in individual treatment. Thus group treatment is probably the only means of treating social difficulties directly on the spot, difficulties which are basically important for behaviour and its disturbances. Another important point is the self-treating nature of the group. It is difficult to assess the therapeutic effects exactly at this stage on an "objective"—e.g., statistical—basis, because there are so many variables, and in our own field of observation these variables change so rapidly. Comparison between group therapy and the equivalent individual treatment, both under civilian and under military conditions, leaves no doubt in my mind about its manifold therapeutic aspects. Full theoretical explanations must await further more systematic research.

THERAPEUTIC FACTORS

Group treatment shares with individual treatment several therapeutic factors. Apart from those we have previously singled out the following are peculiar to the group:

(1) The group situation is a social situation and socialising agency.[2]

(2) A composite of factors which we termed "mirror reaction."[2]

(3) The activation of the "collective unconscious."[2]

(4) The "exchange factor."[2]

(5) The function of the group symbolises the community as a whole, as a powerful forum. The individual sees himself in a new light by consent or disapproval, the boundaries of the ego are under revision. The same is true for the super ego, which represents in the last resort the restrictions imposed by the community on the individual as imparted by parental authority and incorporated into the mind. By its rejection, or tolerance, or approval, the group seems to be able not only to revise but also to modify this formation efficiently. Its effect can therefore be said to be a geniune reconditioning of the structure of ego and super ego.

2. See Foulkes, S. H., Lewis, E. op. cit.

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(6) A peculiar transformation and modification of the individual transference situation (intra-group transference). The group absorbs a good deal of what in individual treatment becomes focused on the therapist himself. This is a very useful feature, especially when there is no time to work out the individual transference situation fully. The improved social adaptation can be carried over much more easily from one particular therapeutic group to any other and in the last resort refers to the community as a whole.

TRAINING THE GROUP THERAPIST

In a short time medical officers of comparatively little psychiatric experience have been able to learn to handle groups, in the way here described, efficiently and successfully. Some of them had a very good natural feeling for group therapy and therefore could improve their technique spontaneously in the light of their own experience once they had exposed themselves to the dynamics of the group. It appears, however, that management and technique can, to an increasing extent, be taught. For such purposes a weekly seminary conducted as a type of group has proved a favourable means of mutual instruction. The successful conduct of group therapy here outlined makes considerable demands on the therapist's patience, balance, and judgment, and also depends somewhat on his personal skill. But it seems to be more interesting from a scientific point of view than any other form of group therapy. It is also largely self-regulatory, and the beginner is not likely to overreach himself.

It has been possible to train for group work in other fields a number of non-medical unit officers. They appear to have derived stimulation and benefit from the group sessions which they could observe and in which they could take part. It is not too much to hope that these experiments in free group therapy will prove of increasing value for positive mental hygiene besides psychiatric practice in general.

I wish to thank Colonel L. M. Rowlette, commanding officer of the military psychiatric hospital, for permission to publish this paper. I am particularly indebted to him and to Lieut.-Colonel Tom Main for their active interest and support.

ADHESIVENESS OF BLOOD-PLATELETS IN HÆMOPHILIA

HELEN M. PAYLING WRIGHT
Ph.D. Lond., L.M.S.S.A.
GIBSON SCHOLAR
From the Department of Pathology, Guy's Hospital Medical School

THERE is still uncertainty about the nature of the abnormality which underlies the failure of hæmophilic blood to clot in the normal time. It is known, however, that, when suspended in their own plasma, the blood-platelets in hæmophilia agglutinate and lyse abnormally slowly. The present observations were made to see whether the blood-platelets in hæmophilia also differed from normal platelets in their degree of adhesiveness to foreign surfaces, as any alteration in this property would in turn affect the readiness with which they would liberate thromboplastin and thus initiate coagulation.

METHOD

The subjects used for these investigations were four hæmophilic patients admitted to hospital because of complications arising from this condition. All gave clear family histories of the abnormality and showed the characteristic increased length of clotting-time.

Blood was obtained by puncture of the antecubital vein with a needle fixed to an all-glass syringe thinly smeared with liquid paraffin. Blood 1 c.cm. was measured into a small clean tube for the determination of clotting-time by the method of Lee and White (1913). A further 5 c.cm. was immediately transferred to a waxed container and gently agitated with heparin 0·2 mg. per c.cm. of blood. Within five minutes 2 c.cm. of the heparinised sample was transferred to a special tube, which was mechanically rotated for eighty minutes. Platelet counts were made on the blood initially and on samples withdrawn from the rotating tubes every twenty minutes. These counts were made by a direct wet method using a modified Rees-Ecker fluid for dilution. The fall in count at successive twenty-minute intervals gave a measure of the adhesion of the platelets to the glass container and hence of their stickiness (for details of this method see Wright 1941).

RESULTS

The initial platelet counts and clotting-times are set out in the accompanying table, together with the immediate cause of admission of the patient to hospital. In all instances the total platelet count fell within the normal limits, but the clotting-times were greatly increased.

The estimations of platelet stickiness for the five observations, compared with similar estimations made on platelets in normal blood under identical conditions

Case	Age (yr)	Date	Reason for admission	Platelet counts (1000 per c.mm.)	Clotting-time (min.)
1	10	May 29, 1941	Hæmaturia	240	112
	14	March 27, 1945	Tooth extraction	286	120
2	26	Oct. 13, 1941	Ankle-joint hæmorrhage	220	140
3	19	Sept. 13, 1942	Tooth extraction	352	92
4	23	Oct. 10, 1943	Knee-joint hæmorrhage	240	110

and with the same concentration of heparin, are given in the accompanying figure, which shows that, during the period of rotation, fewer platelets were lost by adhesion to the vessel wall from the hæmophilic blood than from the normal. The average number of platelets remaining free in the blood sample at the end of eighty minutes was 55% (range 49–61%) in hæmophilic blood, whereas in the normal the average figure was only 36% (range 31–42%) (Wright 1941). The platelets in all four cases of hæmophilia were, therefore, significantly less sticky than the normal.

DISCUSSION

There are two main views about the nature of the abnormality underlying the failure of hæmophilic blood to clot in normal time. Certain observations favour the theory that the plasma is at fault, and that the platelets can only initiate the clotting process when some activating substance is present in normal quantities in the plasma. According to this view, the platelets in hæmophilia are morphologically and functionally normal when suspended in normal plasma (Govaerts and Gratia 1931, Patek and Stetson 1936, Howell 1939, Feissly 1941, Tocantins 1943).

The other and more widely held view is that the platelets in hæmophilia, though as numerous as in healthy blood (Minot and Lee 1916), function abnormally (Fonio 1914). Though the main constituents of the plasma—fibrinogen, prothrombin and calcium, antithrombin, and antiprothrombin—are present in normal quantity, the trigger mechanism of clot formation, which is controlled by the liberation of thromboplastin from disrupted platelets, is relatively insensitive. Ordinarily, platelets coming into contact with foreign substances or with areas of local trauma agglutinate rapidly, and their subsequent disruption is followed by the formation of a clot due to liberation of thromboplastin. In hæmophilia a retardation of agglutination has been noted (Stübel 1914, Howell and Cekada 1926), and an unusual resistance of the platelets to lysis has been described

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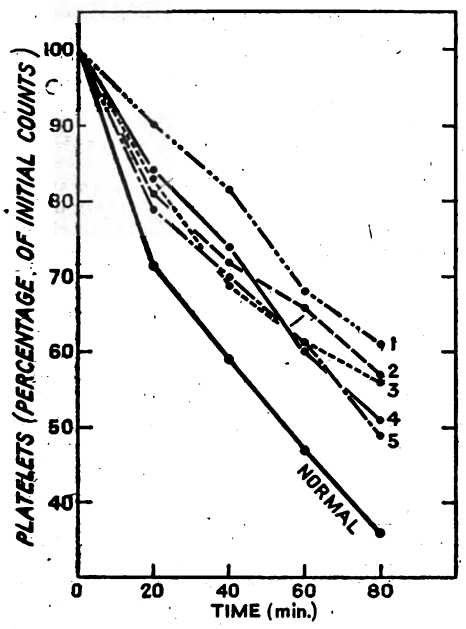
(Minot and Lee 1916, Howell and Cekada 1926, Lee and Erickson 1938, Brinkhous 1939, Wintrobe 1942, Quick 1942).

The findings in the present investigation indicate that there is a considerable decrease in the stickiness of the platelets in hæmophilia, and this confirms the earlier observations of their lessened agglutinability. If these blood elements are less adhesive, their tendency to agglutinate would be diminished; and, since agglutination is a preliminary to rupture (Ferguson 1934), the liberation of thromboplastin would be delayed. It has been suggested (Shionoya 1927, Wright 1941, 1945) that the stickiness of platelets depends on the formation of a thin layer of fibrin on their surfaces consequent on the passage of traces of thromboplastin from the interior of the cell through the platelet membrane. In hæmophilia it may be that the platelet membrane is abnormally dense, so that the outward passage of the thromboplastin is diminished; consequently no fibrin film forms at the surface. At the same time such an abnormality of the platelet membrane would render it more resistant to rupture.



No. of platelets, expressed as a percentage of the initial count at each 20-min. rotation: curves 1 and 2, case 1; curve 3, case 3; curve 4, case 2; curve 5, case 4.

Whether the foregoing abnormality proves to be the cause of delayed clot formation in hæmophilia—and as yet there is no cytological evidence for a physically denser membrane—or delayed coagulation results from some change in the plasma, the observations on the reduced platelet stickiness are explicable. Should the observation be correct that hæmophilic plasma possessed 5–8 times the antithromboplastin activity of normal blood (Tocantins 1943), the reduced stickiness may be brought about by the failure of the fibrin layer to form because the thromboplastin is neutralised as it is liberated at the cell surface before it has had time to react with the prothrombin of the plasma. The consequent reduction of stickiness would still have the effect of making the circulating platelets appear more than normally stable, as their reduced agglutinability would delay rupture, and the mass liberation of thromboplastin necessary for clotting would be greatly postponed.

REFERENCES

Brinkhous, K. M. (1939) *Amer. J. med. Sci.* **198**, 509.
Feissly, R. (1941) *Helv. med. Acta*, **8**, 823.
Ferguson, J. H. (1934) *Amer. J. Physiol.* **108**, 670.
Fonio, A. (1914) *Mitt. Grenzgeb. Med. Chir.* **28**, 642.
Govaerts, P., Gratia, A. (1931) *Rev. belg. Sci. med.* **3**, 689.
Howell, W. H. (1939) *Bull. N.Y. Acad. Med.* **15**, 3.
— Cekada, E. B. (1926) *Amer. J. Physiol.* **78**, 500.
Lee, P., Erickson, B. N. (1938) *Proc. Soc. exp. Biol., N.Y.* **39**, 264.
Lee, R. I., White, P. D. (1913) *Amer. J. med. Sci.* **165**, 495.
Minot, G. E., Lee, R. I. (1916) *Arch. intern. Med.* **17**, 474.
Patek, A. J. jun., Stetson, R. P. (1936) *J. clin. Invest.* **15**, 531.
Quick, A. J. (1942) Hemorrhagic Diseases, Springfield.

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CONTACT DERMATITIS CAUSED BY PENICILLIN

H. R. VICKERS
M.Sc., M.B. Sheff., M.R.C.P.
PHYSICIAN FOR DISEASES OF THE SKIN, ROYAL SHEFFIELD INFIRMARY AND HOSPITAL

CASES of dermatitis due to sensitivity to penicillin have been reported by Pyle and Rattner[1] and by Michie and Bailie.[2] In view of the increasing use of this drug for local application, the occurrence of a further case is of interest. Details of the case before admission to the Royal Infirmary, Sheffield, were obtained from the field-dressing card.

CASE-RECORD

A staff sergeant, aged 30, while serving in the B.L.A. was thrown off his motor-cycle and injured his left leg on May 22, 1945. There was a superficial lacerated wound with abrasions on the inner aspect of the lower leg, caused probably by contact with the foot-rest. Penicillin powder (details of composition not given) was applied to the area several times until the 26th, when the leg was encased in plaster-of-paris because a small fracture of the tip of the left external malleolus was discovered.

June 2: Plaster removed, wound found septic, and walking plaster fitted.

June 13: Plaster removed, wound still looked septic, penicillin powder applied.

June 19: Wound excised, sutured, and sprinkled with penicillin powder. Culture taken from wound at this time was sterile.

June 29: Wound satisfactory.

July 5: Serous exudate began to appear from the region of the wound, and penicillin solution was then given by intramuscular drip in the left thigh, 200,000 units being given in forty-eight hours; during this time the skin of the site of the abrasion was "aggravated."

July 12: Wound not healed; active dermatitis round the site of the intramuscular drip; the area on the leg was treated with penicillin spray.

July 16: Condition worse and he was evacuated to United Kingdom.

July 21: He was admitted to the Royal Infirmary, Sheffield, under the care of Mr. F. W. Holdsworth. There was now active dermatitis, characterised by erythema, vesiculation, weeping, and crust formation, extending from the region of the left internal malleolus up the inner aspect of the leg to the knee and spreading to the outer side in the upper half of the leg. In the area of dermatitis a healed scar at the site of the injury was just visible. There was an area of healing dermatitis on the anterior aspect of the left upper thigh, extending for about 2 in. round the site of entry of the intramuscular drip. No skin disease elsewhere. No evidence of dermatophytosis. No history of previous skin disease or previous contact with penicillin.

Patch test to penicillin solution soaked in gauze and applied to the right upper arm strongly positive (erythema and vesiculation after twenty-four hours).

He was treated with 0·5% silver nitrate solution and later with Lassar's paste, and he was fit for discharge on Aug. 9.

COMMENTS

Since this man only had either penicillin powder or penicillin solution as spray applied to his leg, and since the treated area became worse with systemic penicillin and the patch test with penicillin solution was strongly positive, this is a true case of penicillin sensitisation dermatitis. The abraded skin was in contact with penicillin for 40 days—i.e., from May 26 to July 5—before exudation, presumably commencing dermatitis, appeared. In Michie and Bailie's case,[2] the time taken for sensitisation to develop was 17 days, but the exposure

1. Pyle, H. D., Rattner, H. *J. Amer. med. Ass.* 1944, **125**, 903.
2. Michie, W., Bailie, H. W. C. *Brit. med. J.* 1945, **1**, 554.

DR. PAYLING WRIGHT: *References (continued)*

Shionoya, T. (1927) *J. exp. Med.* **46**, 19.
Stübel, H. (1914) *Pflüg. Arch. ges. Physiol.* **156**, 391.
Tocantins, L. M. (1943) *Amer. J. Physiol.* **139**, 265.
Wintrobe, M. M. (1942) Clinical Hematology, Philadelphia.
Wright, H. P. (1941) *J. Path. Bact.* **53**, 255; (1945) *Ibid*, **57**, 382.

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was much more intense. In Pyle and Rattner's paper [1] one severe and three mild cases of penicillin sensitisation are reported in a medical officer and three hospital orderlies respectively, who had handled penicillin in its preparation and administration, the rash appearing in the medical officer within a short time and in the hospital orderlies within eight weeks of contact with the substance.

It is therefore important for those using penicillin to realise that, as with sulphonamides, the application of penicillin to damaged skin can sooner or later induce a sensitisation which might lead to generalised dermatitis on subsequent administration of the substance. The principles of the use of a sulphonamide locally on the skin—i.e., that if there is no immediate response to the treatment the application should be discontinued, and that the substance in any case must be used for the shortest possible time—should also be followed with penicillin.

ALLERGIC REACTION TO PARENTERAL PENICILLIN

R. E. HASWELL
M.B. Durh.
MAJOR R.A.M.C.; SPECIALIST IN DERMATOLOGY

J. F. WILKINSON
M.B. Birm.
CAPTAIN R.A.M.C.; GRADED DERMATOLOGIST

From an Army Dermatological Wing

PARENTERAL sodium penicillin has been used extensively in the treatment of the severer and more resistant types of cutaneous infection, usually in cases with multiple sensitivities in which local therapy was of no avail. Among 56 cases so treated by us 4 cases of allergic reaction resembling serum-sickness developed from six to twelve days after the first injection.

CASE-RECORDS

CASE 1.—A coder, aged 22, was admitted on Feb. 15, 1945, with a severe impetiginised seborrhœa of face, neck, and ears. A year previously he had had a sulphanilamide sensitisation dermatitis; he was also sensitive to brilliant green and mag. sulph. He had previously had penicillin cream applied to the lesions in a forward hospital (Jan. 26–Feb. 9, 1945). Bacteriological examination yielded *Strep. pyogenes*, *Staph. aureus*, and *B. proteus*.

He was immediately started on a course of sodium penicillin parenterally (16,000 units three-hourly up to 360,000), finishing on Feb. 19 with local application of lead and calamine lotion. By the 20th his condition had much improved, and there was very little secondary infection.

On the 24th he complained of irritation round his buttocks. From that date until March 4 he had general malaise, difficulty in swallowing, and extreme skin irritability (his skin surface was covered with scratch marks), and he ran a low-grade pyrexia of 99°–100° F. This was accompanied by (1) a generalised urticarial eruption; (2) transient œdema of the orbital tissues, lips, and hands; (3) patchy erythema; (4) transient effusion into his shoulder-joints, with painful movement; and (5) slight general adenopathy (his cervical glands were previously enlarged as a result of the facial infection). A white-cell count showed 11,500 cells per c.mm. (segmented neutrophils 63%, stab neutrophils 6%, eosinophils 5%, lymphocytes 24%, monocytes 2%). Cutaneous tests to penicillin were negative.

He made an uneventful recovery, with no recurrence of the allergic reaction.

CASE 2.—A private, aged 38, was admitted on Dec. 5, 1944, with a history of recurrent attacks of infected seborrhœic dermatitis for the previous six months. On admission he had extensively infected seborrhœic dermatitis of his scalp, neck, chest, and limbs. Bacteriological examination yielded *Staph. pyogenes* and *Strep. pyogenes*.

Initially he was treated with penicillin cream, but this was stopped after four days as his condition was deteriorating owing to intolerance to the 'Lanette-wax' base. His condition remained static under local applications, and on the 13th he was put on sodium penicillin, 16,000 Oxford units parenterally every three hours, and lead and calamine lotion locally. He was given 360,000 units, finishing his course on the 16th.

On the 19th he had general malaise and much generalised skin irritation. Next day he had a generalised urticarial eruption, with some patchy erythema. This condition lasted three days, accompanied by a low-grade pyrexia. Cutaneous tests to penicillin were negative.

He made an uneventful recovery and was returned to duty.

CASE 3.—A trooper, aged 32, was admitted on Nov. 4, 1944, with eight months' history of recurrent attacks of skin trouble. He had extensive secondarily infected seborrhœic lesions on his scalp, ears, and limbs, with a flavine contact dermatitis of his right antecubital fossa. Bacteriological examination yielded *Strep. pyogenes* and *Staph. pyogenes*.

Initially he was treated with penicillin cream, but this was discontinued after seven days owing to intolerance to the lanette-wax base. Various external applications were tried, but the condition remained stationary.

On Dec. 4 a course of sodium penicillin was started parenterally (16,000 units three-hourly until 360,000 units had been given). The skin condition had much improved on the 7th, when the course had finished.

On the 16th he felt unwell and had a pyrexia of 99·8° F. For the next three days he ran a pyrexia of 99°–101° F accompanied by (1) some adenopathy; (2) much skin irritation and patchy erythema; and (3) generalised urticarial eruption, with transient œdema of lips and difficulty in swallowing. By the 20th this reaction had disappeared; nor did it return again. Cutaneous tests to penicillin were negative.

His skin condition cleared uneventfully, and he was returned to duty in a lower medical category.

CASE 4.—An aircraftman, aged 21, was admitted on Nov. 12, 1944, with an extensive sulphanilamide contact dermatitis of left leg and foot of two months' duration.

Initially he was treated with penicillin cream locally for ten days; and, after almost clearing, the condition relapsed, showing local sensitivity to the lanette-wax base. Bacteriological examination yielded *Strep. pyogenes* and *Ps. aeroginosa*.

His condition deteriorated with local applications, and on Dec. 28 treatment with parenteral sodium penicillin was instituted, with 1% acetic-acid compresses applied locally. 16,000 Oxford units was given three-hourly until 500,000 units had been given. The skin condition had almost healed when the course finished on Jan. 1, 1945.

On Jan. 5 he had malaise and anorexia, and on the 6th extreme generalised irritation of the skin. This continued for the next two days and was accompanied by patchy erythema and transient swelling of the hands, lips, and orbital tissues, with a mild pyrexia. By the 9th the symptoms had subsided.

Subsequently the leg condition relapsed and he was evacuated. Cutaneous tests to penicillin were negative.

COMMENTS

The features of these allergic reactions resembling serum-sickness were identical and followed from six to twelve days after the start of treatment with parenteral penicillin.

In all cases previous local penicillin treatment had been used, but it seemed to play no part in the reactions, and no cutaneous sensitivity and no antibody formation resulted. Penicillin cutaneous tests were negative, and no general response resulted. The cutaneous tests were carried out with solutions similar to those used parenterally—i.e., 10,000 units per c.cm. The tests were threefold: patch test applied to unabraded skin; scratch test; and intradermal injection.

The penicillin used came from various batches of different commercial products; hence it appears that the reaction was not due to a contaminating factor of one particular batch or producer.

SUMMARY

Four cases of identical allergic reactions resembling serum-sickness and due undoubtedly to the parenteral administration of penicillin from different batches are described.

We wish to thank Brigadier E. R. Boland, the consulting physician, for permission to publish this report.

AMERICAN Service doctors are offered a twelve weeks' refresher course at U.S. Army hospitals before demobilisation. Attendance is voluntary.

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Preliminary Communications

USE OF IONISATION IN CHECKING BLEEDING

THE liberation of metallic ions from the anode was found to affect blood coagulation. Fifteen different metals and several alloys were compared by applying equal current densities (5×10^{-3} amp. per sq. cm.). Zinc ions caused a considerable acceleration in clotting near the anode, and inhibition of clotting was observed near the cathode.[1]

Only a weak electric current was used and no heating was caused. The application of the method to hæmostasis in vivo has been examined by experiments on rats. The rats were anæsthetised, and the liver and kidney were traumatised by cutting or crushing with forceps. Bleeding was profuse, and 9 out of 12 animals died within 48 hours of this injury. In a second group of rats, with similar injuries, an electrode armed with a swab soaked in 0·5% zinc-sulphate solution and connected to the positive pole of a battery was placed on the injured surface; another electrode in a saline pad, connected to the negative pole, was placed on the skin of the back. A current of 20 mA. was applied for 1–2 min. No visible bleeding was seen after this procedure, and all the animals made an uneventful recovery. Three of the livers, treated for the longest time (3–5 min.) with the current, were removed 16 days later. The injury had healed, and organised fibrous tissue was found at the site of trauma. The immediately adjacent liver-cells appeared to be normal in structure, staining reactions, and glycogen content.

Dr. Ian Macnab, of the Genera lHospital, Birmingham, has tried the method in cases of prostatectomy. The bladder was filled with 0·5% zinc-sulphate solution, and the positive pole was inserted half-way through a catheter, while the negative pole was applied in the form of diathermy pads on the patient's back. A current of 20 mA. was applied for 10–20 min. The results were encouraging and without any apparent ill effects.

For the histological examinations I am indebted to Dr. A. D. T. Govan of this medical school.

F. SCHÜTZ, M.D. Vienna
Reader in Chemical Pharmacology.
Medical School, University of Birmingham.

Medical Societies

SOCIETY OF MEDICAL OFFICERS OF HEALTH

AT a meeting of the fevers group on Feb. 1, with Dr. M. MITMAN, the president, in the chair, a talk on the

Control of Infectious Diseases in America

was given by Dr. ROBERT CRUICKSHANK (director of the central laboratory of the Public Health Laboratory Service). Discussing these diseases in two main groups, the diarrhœal and the respiratory, he said that in the south-western States the death-rate from the former is very high; for example, the annual figure for San Antonio, Texas, is 200 deaths per 100,000 population. The bulk of these are infections with the dysentery and salmonella organisms; as in Britain, many cases of acute diarrhœa are not reported to the health authorities. In the epidemiological studies of Hardy and Watt, based on some 1600 cases of diarrhœa and examinations from 850 households totalling some 8000 fæcal cultures, infection proved to be most prevalent among children aged 1–9 years and most severe in those under 2 years. In older children about half of those infected showed clinical signs, whereas in adults the ratio was 1 in 4 or 5. In one survey, of 380 cases which yielded positive stool cultures, less than 10% had diarrhœa, a quarter were convalescent carriers, and the rest were healthy contact carriers. In America the infection is rarely water- or milk-borne. Food-borne outbreaks occur in institutions; flies are not apparently important vectors; and infection usually spreads direct from person to person, facilitated by low standards of personal hygiene.

Sulphadiazine is used extensively and successfully for Flexner infections; in Sonne infections both soluble and insoluble sulphonamides are less successful. Sulphadiazine has also been used prophylactically for dysentery in institutions, but there is a risk of establishing drug-fast strains. Streptomycin has produced rapid clinical and bacteriological cure in cases and carriers infected with sulphonamide-resistant Flexner bacilli. There is considerable interest in methods of improving food and restaurant hygiene, education of the food-handler being regarded as a most important factor.

Gastro-enteritis does not seem to be such a serious problem in the U.S.A. as it is here. Neonatal diarrhœa, with a mortality of over 30%, is attracting a good deal of attention; a virus has been isolated from infants suffering from stomatitis and diarrhœa, but the clinical course of this disease is unlike the gastro-enteritis prevalent in this country.

Attempts are being made to disentangle the hotch-potch of upper respiratory infections and to control their spread in hospitals, particularly by barriers of ultraviolet light. In schools ultraviolet light has given some success in controlling the spread of the common childhood fevers such as measles, mumps, and chickenpox. Progress is being made in the practical application of aerial antiseptics.

Streptococcal infections have been very troublesome in army training camps, particularly in New England and the uplands of the western States. They have been followed by a high incidence of rheumatic fever. Recent work has suggested that heavy nasal carriers are important reservoirs for the spread of streptococcal infections, and, as they may have the obvious stigmata of infection, these carriers should be sought out by routine swabbing. Oiling of floors and bed-linen has proved helpful in the control of streptococcal infection. Controlled field trials of vaccination against pertussis are going on in a number of States, and good results are reported with three spaced doses of plain or alum-precipitated pertussis vaccine. Antibody tests and agglutinogen skin reactions are being used as indices of the immunity produced by pertussis antigen. A mouse test has recently been introduced which may prove very useful in assessing the relative antigenic potency of different pertussis vaccines.

Dr. E. H. R. HARRIES (L.C.C.) asked about the present position of γ-globulin in measles treatment and prophylaxis, and whether work has been done in America on the occurrence of congenital defects in infants born to mothers who suffered from rubella in the early months of pregnancy. Dr. CRUICKSHANK replied that γ-globulin is too depressant to be given intravenously for the treatment of measles; results of its use in measles prophylaxis are in line with experience here. It has been confirmed that γ-globulin given prophylactically will prevent infective hepatitis. American workers are much interested in the problems raised by rubella.

Dr. WILLIAM GUNN (L.C.C.) asked about streptomycin, and Dr. CRUICKSHANK gave details illustrating its valuable therapeutic properties in influenzal meningitis. It has also given promising results in experimental tuberculosis and in certain human cases of progressive tuberculosis. American supplies are still under government control and the cost of production is very high, but a number of firms are now making streptomycin on a commercial scale and there are indications that, in addition to its possible use in tuberculosis, it will act as a chemotherapeutic substance complementary to penicillin.

The PRESIDENT said that in this country there is a body of enlightened caterers alive to the importance of kitchen hygiene. The space allowed in catering establishments for the preparation of food is wholly inadequate; he had good authority for stating that it should comprise a third of the total floor space. Architects are interested chiefly in designing the restaurant, lounges, and bars, and few of them are competent to plan kitchens. The Americans are ahead of us in providing refrigerator space. Incubation after food contamination is an important factor in food-poisoning and refrigeration prevents it. Dorling [1] reported an excellent example of such incubation: a woman of 61 living alone opened a tin of wholesome soup and in doing so contaminated it with staphylococci from her septic thumb; she consumed half the soup without ill effect and left the rest in her warm kitchen for 7 days; she then rewarmed the remaining half and consumed it; within 3 hours she was violently

1. Schütz, F. *J. Physiol.* 1942, 101, 27.

1. Dorling, G. C. *Lancet*, 1942, i, 382.

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ill with food-poisoning and within 24 hours she was dead. The speaker agreed that nasal carriers are important disseminators of infection, not only of diphtheria bacilli and streptococci but also of pathogenic staphylococci. From his bacteriological examinations of the nose in septic cutaneous conditions, including furunculosis, he was satisfied that many of the skin lesions were auto-infections from the nose and were not attributable to poor health. The carrying of staphylococci in the nose is common and the frequency with which people's hands stray to their noses is surprising. For the treatment of intestinal infections he preferred to combine an unabsorbable sulphonamide, 'Sulphasuxidine,' with an absorbable one such as sulphamezathine or sulphadiazine.

Reviews of Books

Entourses du cou-de-pied et du genou

L. LÉGER, chirurgien des hôpitaux de Paris; C. OLIVIER, ancien prosecteur à la faculté de médecine. Paris: Masson et Cie. Pp. 215. Fr. 200.

THE pathology of ligamentous injury at the knee and ankle is obscure and neglected. The older view that a complete or partial rupture is usual has been overshadowed by Leriche's conception of a mildly contused ligament responsible for prolonged reflex œdema and disability, curable by local anæsthesia. The results of exploring recent injuries lead Dr. Léger and Dr. Olivier to believe that gross damage is much commoner than would be expected; and they think that the use of procaine infiltration may be followed by late sequelæ if proper immobilisation or operative repair is neglected. For the ankle, their treatment is conventional—intervention is seldom indicated—but they do not mention manipulation for chronic sprain. For the knee they emphasise that laxity must be sought under the X-ray screen, after local anæsthesia, and that air arthrography is of value in defining the site of injury. They see an increasing place for early operative repair in fresh cases, and hold that this yields better and quicker results than either local anæsthesia or orthodox immobilisation. They do not hesitate, therefore, both for these cases and for chronically unstable joints, to resort to the extensive reconstruction procedures of the Hey-Groves type which have largely fallen into disuse in this country.

Clinical Pathology

(5th ed.) P. N. PANTON, M.A., M.B. Camb.; J. R. MARRACK, M.A., M.D. Camb.; with the assistance of H. B. MAY, M.A., M.D. Camb., M.R.C.P. London: Churchill. Pp. 450. 21s.

WHEN Dr. Panton's *Clinical Pathology* first appeared 32 years ago it was almost the only book in English which dealt adequately with the subject, and subsequent editions revised in association with Professor Marrack continued to keep abreast with the expanding field of clinical pathology. It must be confessed, however, that the fifth edition is somewhat disappointing. It provides succinct information about the recent advances —dealing with cold agglutinins, fertility tests, liver puncture, penicillin, prothrombin, Q fever, Rh-agglutinogens, copper sulphate method for serum proteins, sulphonamides, sternal puncture, acid phosphatase, and Vi-antigen—but it has not been rewritten to bring it, as a whole, into line with modern practice. This particularly applies to the section on laboratory hæmatology: the value of sternal puncture in diagnosis is not discussed; there is no mention of the newer methods of investigation in the hæmolytic anæmias or the hæmorrhagic diatheses; and many well-defined hæmatological entities get no notice. The technical procedures involved in the various investigations are well described; but the reader will generally wish for more guidance. In clinical pathology one requires always to know what investigations are likely to be useful in reaching a diagnosis in a case presenting certain symptoms, and what is the probable significance of alterations from the normal. Little can be said against the bacteriological section, though Army bacteriologists will scarcely agree that in the identification of the clostridia "reference to tables of fermentation reactions is usually adequate to put a name to the organisms." But the section on parasitology has not been revised since before the war, and the section on mycology ignores the more recent advances both in knowledge and nomenclature. The chapters on immunity and antibacterial chemotherapeutic substances are good, though some of the information on transfusion technique is not quite in line with current practice, and it would have been well to mention that all rubber tubing for penicillin administration sets should be tested lest it is an inactivating batch. Histology is excellent, as is to be expected of anything written by Dr. W. W. Woods; yet one would have preferred the orientation to be different; gynæcological pathology, which bulks so large in the clinical pathologist's work, is not considered as such, and there is no discussion of the features by which one determines whether a piece of "granulation tissue" or a "polyp" is the result of chronic inflammation or a benign or malignant neoplasm.

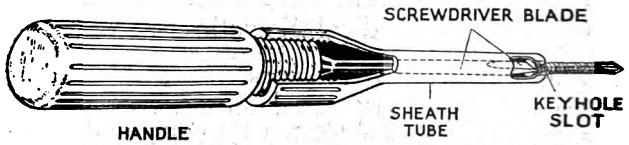
This is a work by two leading pathologists containing much valuable and accurate information set out clearly both in text and illustration. If its reception appears ungrateful it is only because the previous editions were so remarkably good when they were published. Recent times have been most unfavourable to the radical revision that such a book must frequently require; but we hope that in the next few years the authors will find leisure to rewrite "Panton and Marrack" so that the sixth edition will be the guide that all clinical pathologists will want to keep by their microscopes, colorimeters, or incubators.

New Inventions

A SCREW-HOLDING SCREWDRIVER

IN bone-plating operations the insertion of self-tapping screws with an ordinary screwdriver is an unsatisfactory procedure. The bone into which the screw is being driven yields or moves with each thrust of the driver, and much time and patience are wasted by the driver blade slipping out of the slot in the screw head, often burring the latter to such an extent that the screw requires changing.

To obviate these difficulties a screwdriver has been designed which grips the bone-screw rigidly until it has been driven home. The accompanying figure shows



Cut-away diagram to show construction. About half scale (overall length 5½ inches).

the essential features of the construction of the instrument and the manner in which it holds the screw.

At operation the bone-screw is held by the assistant in a pair of Lane's screw-holding forceps, and the head of the screw is inserted through the keyhole slot in the end of the sheath tube. The surgeon screws in the handle of the screwdriver until the blade engages the slot in the screw head and the handle is then screwed home tight. The bone-screw is securely held in the instrument and can be driven almost fully home in the bone. When the end of the sheath tube comes to lie against the bone-plate it is gripped by its expanded proximal end while the handle is unscrewed three or four turns. This allows the sheath tube to be slipped off the head of the screw. The screw is then driven right home with an ordinary screwdriver.

The original models of this instrument were made for me by the R.E.M.E. and some of these have been in use for the past eighteen months. The instrument is now being made by Messrs. Down Bros. Ltd. The sheath tube is made in two sizes, to fit either a Sherman's or a Lane's screw. If both types of screw are in use in an operating-theatre, a single driver with two sheath tubes will fit both types of screw. The instrument is made of stainless steel and brass, the whole being chromium-plated.

F. BRIAN THOMAS, M.B. Camb., F.R.C.S.
MAJOR R.A.M.C.; ORTHOPÆDIC AND SURGICAL SPECIALIST

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THE LANCET

LONDON: SATURDAY, MARCH 2, 1946

Social Adventure

THESE two words might well be a kind of slogan for the voluntary social-service movement in post-war Britain. That movement has gone through many a crisis in the past century and has learnt many lessons. Beginning as a spontaneous reaction against a harsh and deterrent poor-law, it was at first largely parochial and sentimental in its operation. Then, with the formation of the Charity Organisation Society in 1869, it began to learn that social work and the relief of suffering was a skilled job requiring knowledge and orderliness. With the present century came the intervention of the State and the new conception of social service as a statutory function. School meals and school medical inspection in 1906 were followed by the "Lloyd George" insurances against sickness and unemployment in 1911 and 1912. These mild intrusions were regarded by some as the death-knell not only of virile British manhood but also of the voluntary social movement. Thenceforth, said the prophets, the springs of charity would dry up and no private institutions would be able to withstand the onslaught of the Leviathan. But it was not so. The voluntary movement spread together with the statutory instead of being ousted by it. Always new gaps in the social service structure appeared, and always a response from the voluntary spirit was forthcoming.

Never was this more evident than in the recent war years. The thousand citizens' advice bureaux were a great achievement of the National Council of Social Service and its local congeners. Here, too, came into play new methods of financing such private social institutions, which render high service to the community and are ancillary to the State provision. The necessary ways and means were found partly from voluntary sources, but partly in the form of generous grants from the public authority. That meant in effect H.M. Treasury and the taxpayer. And why not? The Treasury has dealt the voluntary movement a side blow by so heavily taxing the rich that they have far less to spare for charity than they had in the old days, and somebody has got to make good the deficit unless we are to lose the inestimable boon of an unofficial and free element in our social services. The same method of a Government grant amply justified itself in the running of voluntary occupation centres for the long-unemployed men and women in the 1930's. In some services it may be the local authority rather than the central government that is the source of grants-in-aid. That seems to be the latest view of the Ministry of Health as regards citizens' advice bureaux. But the principle of public subsidy will be the same.

What of the future? There will be a more insistent call than ever on the spirit of adventure and initiative which has characterised the voluntary social worker and his institutions hitherto. Their difficulties, particularly of finance, will certainly be serious, but will be matched by their opportunities. This year or in 1947 we shall see legislation for all-in insurances and a National Health Service. Family allowances are already law. Inevitably there will appear in these great projects certain lacunæ that can only be filled by unofficial effort. One current example is the case of the persistently unemployed ex-Service man, whom neither the labour exchange nor the resettlement advice office can help any further. Must he be left to go sour on the dole—receiving assistance on a test of need, not benefit as a right—for ever? No. The trained psychiatric case-worker, untrammelled by official codes or regulations, might really help him to get over his hopeless sense of maladjustment.

Particularly vital to medicine will be the vast new problems of sick-visiting, mingled with social case-work, which are looming up under the sickness insurance and health services. The major purpose of almoning as of home-visiting should always be the improvement of health and welfare; but the need of some official check on malingering, on disregard of the panel doctor's advice, and even on sheer stupidity, must be faced by any realistic administration. For one thing the cost of sickness, which will be much increased by the higher cash benefits, will make the elimination of waste correspondingly more important. On this point Ministers are pledged to improve upon the somewhat dubious technique of the approved societies, though how they will do it is a secret still locked in the breasts of Mr. JAMES GRIFFITHS and Mr. ANEURIN BEVAN. Already local authorities provide health visitors for mothers and children, but in future their duty in this respect will probably be enlarged. There should be health visitors (not sick visitors) to supplement the whole range of the family doctor's service and to coöperate in it. Far larger numbers of sociomedical workers of several types will be required, and they will all have to be trained. The question is, which types should be full-time paid officials and which should still be unofficial? It is under voluntary institutions and societies that the highest kind of social case-work and of professional case-worker have hitherto been found.

Such people will be invaluable in future for dealing with the more complex situations of life, especially those in which social malaise rather than medical malaise lies at the roots of the misfortune. But wide freedom of action is essential in such a service. Expert case-workers have to be ready to deal with a great variety of human circumstance: they cannot function successfully in departmental blinkers, and their approach to the problem household will be easier if it is unofficial. Hence it will pay the Government not only to encourage but actually to subsidise voluntary effort in this field. They are in fact doing it already. Equally the private welfare agencies of the country should show readiness to expand, to experiment, and to coöperate in new ways with the State services. The voluntary spirit is deeply ingrained in the English people and has been mainly responsible for our social advances. It will still be needed for arduous work and adventure, and will find new application in the days to come.

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Œsophageal Speech

THE prognosis of early intrinsic carcinoma of the larynx is good. Nearly 80% of cures have been claimed in a large series treated by laryngofissure[1] and the newer teleradium treatment is promising. Where the disease is widespread, opinion on the whole prefers laryngectomy to radiotherapy, but the statistics are difficult to compare. The disadvantages of surgery have diminished now that the septic complications which formerly hindered recovery are generally preventable with sulphonamide and penicillin, and convalescence is correspondingly rapid. Almost more important, however, is the fact that the patient may expect to develop a useful voice quite soon after operation. The acquisition of œsophageal speech—at one time a rare achievement—is today regarded as the normal outcome, and all who have seen HOWIE'S cases in Glasgow, or those recently demonstrated by COLLEDGE[2] in London, have been impressed by the ease and fluency with which patients can speak after removal of the larynx, as well as by their cheerful bearing. Though laryngologists have long been familiar with its principles and practice, a brief review of this curious accomplishment may be of interest to others.

Œsophageal speech is produced by a stream of air passing upwards through the œsophagus instead of through the larynx. This air must first be swallowed, and the patient's first task is to learn to swallow it. Preoperative instruction is not essential, but the patient will acquire the new technique more quickly if he practises air-swallowing in the week or so preceding operation.[3] He is taught to do so by closing the glottis, closing the lips, and expanding the chest as he swallows. The air thus aspirated into the œsophagus is then brought up in a noisy belch. After operation, when the pharyngeal wound is soundly healed, he resumes air-swallowing and belching. Air-swallowing may be easier after operation because the cricopharyngeus cannot then bring the cricoid cartilage against the œsophagus. If the patient has difficulty in learning the trick, he may find help in sucking a boiled sweet, or by taking acid and alkaline powders which effervesce in the stomach; but this method should not be used for more than a few days, for he has to learn to rely on his own resources. He is not allowed to whisper, for whispering involves contraction of the cricopharyngeus, whereas air-swallowing demands its relaxation. He very soon learns to convert the noisy belch into something like speech. Patients hold differing views on the sounds most easily produced. Consonants like *sh* and *ch* are usually practised first; then a vowel sound is tried; and then these are combined to make words such as *church* and *shrub*. Explosive consonants *p*, *d*, *k* may then be added to the repertoire, and other words are thus built up.[4] At first each syllable requires one intake of air, but soon several syllables, or one long word, can be produced with each intake. Short sentences are next attempted. The pauses for air-swallowing lead to an abnormal grouping of the words—a characteristic of œsophageal speech that is only slowly overcome. The patient must learn to dissociate the swallowing of air from his respiratory rhythm; otherwise the blowing sound at the tracheostome may mask his speech.

LINDSAY, MORGAN, and WEPMAN[5] have investigated the mechanism of œsophageal speech radiographically after the patient has swallowed a thick barium paste to outline the walls of the pharynx and œsophagus. During air-swallowing the nasopharynx is closed off, and the tongue goes up and back, thus forcing the air down into the pharynx. At this point the pharyngo-œsophageal sphincter suddenly opens, allowing air to pass into the œsophagus. Usually the œsophagus acts as the air reservoir, but one man whose voice has been recorded[6] uses his stomach as an additional air store, and he can make himself heard at 50 yards. During phonation the air is pushed through a narrow channel into the hypopharynx. This pseudoglottis, which is 1–2 cm. long, is usually opposite the sixth cervical vertebra, at the level of the lower edge of the inferior constrictor—more often called the cricopharyngeus by laryngologists. Every effort should be made at operation to preserve intact this muscle and its nerve-supply. In some patients the pseudoglottis is formed at higher levels in the hypopharynx.

BELL and MUNRO have made photographic records of œsophageal speech by getting patients to talk into a microphone connected to a cathode-ray oscillograph. The wave-forms are unlike those of laryngeal speech; it is evident from the oscillograms that the pseudoglottis vibrates very irregularly, and this explains why the voice is husky and indefinite in pitch. It has been claimed that a few patients have learned to modulate their voices through a few tones or even as much as an octave, and it would be interesting if such claims could be substantiated by the oscillograph. But although the puffs of air coming up from the pseudolarynx are irregular in amplitude and sequence, they set the cavities of the pharynx, mouth, and nose in vibration in the same way as do the regular puffs from the true larynx. In normal speech it is the vibrations of higher frequency produced in these cavities that enable us to distinguish one vowel from another: the laryngeal tone plays no part. The consonants may be regarded as particular ways of beginning or ending vowels by movements of the tongue, palate, lips, or teeth. It is therefore easy to see that intelligible speech can be formed with an imperfect larynx. Both the vowels and consonants are derived from well-established speech reflexes. It follows that the patient should begin to speak as soon as possible after operation, before he has lost the kinæsthetic patterns of speech.

It is recommended that after laryngectomy patients should practise for three periods of half an hour each day: fatigue must be avoided in the early stages. Later when they are proficient, the difficulty may be to persuade them to stop talking. Some indeed show what may be termed a benign exhibitionism, which can be turned to profit in the instruction of others; and HOWIE'S patients have actually formed a club in which the older members train the novices. Nothing of course could be more encouraging to those about to lose their larynx than to meet someone who finds the loss no serious disability; but if such a person is

1. Clerf, L. H. *Arch. Otolaryng.* 1945, **42**, 228.
2. Colledge, L. *Proc. R. Soc. Med.* 1945, **38**, 354.
3. McCall, J. *Arch. Otolaryng.* 1943, **38**, 10.
4. Levin, N. M. *Ibid*, 1940, **32**, 299.
5. Lindsay, J. R., Morgan, R. H., Wepman, J. W. *Laryngoscope*, 1944, **54**, 55.
6. Bell, G. H., Howie, T. O., Munro, H. N. unpublished.

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not at hand, good use can be made of gramophone records such as those demonstrated on Dec. 1 to the Physiological Society.[6]

Group Therapy

THE first really bright spot in *The Messiah* is the chorus "All we like sheep have gone astray." The audience smiles happily; gaiety seizes the orchestra; and the choir thoroughly enjoys its group-confession of naughtiness. The sinner is a man cut off from his fellows; and atonement is sweet benison—as has been known throughout the ages. There is in fact nothing new about group therapy: ÆSCULAPIUS practised it, and there are instances of it in both Old and New Testaments. Nevertheless it is a far cry from Jacques's [1] "Ducdame" to BION'S [2] "leaderless group"; and certain differences exist between the Brick Lane branch of the United Grand Junction Ebenezer Temperance Association [3] and the war-time "psychoneurotic therapy groups" described in this issue by Major FOULKES as an extension of the work done in pre-war days by FOULKES and LEWIS.[4] No longer does the group conductor, for instance, rely on community singing, vicarious testimony, perspiration, sex-appeal, and all the other weapons employed by Brother Humm: his rôle nowadays demands a treading delicately rather than a rushing in.

The neurotic, like the sinner, is an isolate. In group therapy the patient, in addition to individual attention from his trusted doctor who "thoroughly understands his case," is drawn out of his isolation into a social situation in which, like the repentant sheep, he feels at home. He is a fellow-being, on equal terms with the others. Furthermore, his discovery that his morbid ideas, anxieties, and impulses are not unique but are experienced by others makes him feel less of an outcast and diminishes his feelings of anxiety and guilt. Particularly is this brought about when he finds that the super-ego of the group is more benign and tolerant than his own tyrannical conscience. The obsessional patient may then, by means of identification and contrast, reshape his own super-ego into a more realistic ideal—in other words, he may unconsciously lower his standards to a more practicable and attainable level. Beyond and beneath the mere words and ideas exchanged in discussion, however, changes are wrought on a deeper plane. The collective unconscious of the group is meanwhile making itself felt. It supplies a super-ego which is its own inherent property and not merely an average drawn from those of its individual members. Dreams and symbols have a wider and deeper significance when their associations are "pooled" by the group. Explanations and interpretations which spring from the group have the power to strike home more forcibly than those supplied on demand by the psychiatrist. Even though the actual discussion may fail to show the feeblest glimmer of pentecostal fire, the psychiatrist is not discouraged. His rôle is that of the angel who troubles the waters, from the depths of which comes wisdom. And deep calleth to deep.

As any Service medical officer will confirm, the morale of a unit can be measured by the smallness of its sick-parades. Ills of the flesh do not assail a keen and happy unit to anything like the extent that they bother a unit which is "browned off." In his letter on another page Captain DAY suggests likewise that remarkably good all-round health will be maintained by a civilian group if it is engaged in a progressive and creative enterprise. *Mens sana in corpore sano*—or *Corpus sanum in mente sana?* Assuredly neither one nor the other, but both indivisibly.

1. *As You Like It.* Act II, scene 5.
2. Bion, W. R. *Lancet*, 1943, ii, 678.
3. *Pickwick Papers*, chap. xxxiii.
4. Foulkes, S. H., Lewis, Eve. *Brit. J. med. Psychol.* 1944, **20**, 175.

Annotations

STANDARDISING NUTRITIONAL SURVEYS

TOWARDS the end of 1944 the advisory committee on nutrition surveys which had been set up by the Nutrition Society called together a number of English and foreign experts, who happened to be in this country at that time, and established a standing advisory committee for coördination of methods of survey in liberated territories. This body appointed three panels, the first to investigate laboratory methods and the second clinical ones, and the third to study methods by which actual food surveys might be carried out. The first and third panels have now issued their reports (on typewritten duplicated sheets), which can be obtained from Prof. J. R. Marrack, London Hospital, E.1.

The first report, of 67 pages, contains a great deal of critical information about the estimation of plasma proteins and hæmoglobin, and some limited advice about the value of vitamin assays and saturation tests. A long table shows the values obtained for hæmoglobin and plasma proteins in men, women, and children by various investigators using various methods. Many of the technical methods are explained in appendices, and there is a bibliography of 200–250 references. The report on the methods for dietary surveys is shorter and contains advice about the persons one should aim at studying, how the samples of the population may be selected, and how the results can be presented, as well as a description of various methods of collecting the information desired about the food eaten. There is a section also containing hints on how to interview subjects. This report has no bibliography. It includes some data on European food-supplies: these are essentially tables of food composition, with a few suggestions about the applicability of some of the data to the various European countries.

It is evident that a great deal of work has been put into the preparation of these reports, but they are difficult to follow in their present form, and if they are to be of wide use the "liberated territories" will have to be taken off their title-page and they will have to be printed. It must be admitted, however, that most of the information is already accessible in printed form, and not all will agree with the desirability of standardising methods. The history of international research and investigation, moreover, does not suggest that European countries will readily adopt recommendations, coming from outside, which they did not help to prepare.

RELIEF AND PREVENTION OF ACUTE MASTITIS

ACUTE puerperal mastitis is an unpleasantly frequent complication among women delivered in hospitals and maternity institutions, and Fulton [1] suggests that the incidence among women delivered in their own homes, although lower than in hospital, is by no means negligible. Apart from protracted maternal distress and discomfort the most serious consequence of this condition is the effect on the infant of the abrupt termination of breast-feeding which nearly always results. Bacteriological investigation usually discloses a coagulase-positive strain

1. Fulton, A. A. *Brit. med. J.* 1945, i, 693.

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of staphylococcus in the milk, and finally in the pus from the affected breast, and it can commonly also be recovered from the throats of the infant, the mother, and their attendants. The prevalence of an invasive staphylococcus in the mother's environment seems to be the main ætiological factor: others, such as the method of breast-feeding and the attention paid to the toilet of the breasts, are probably less important.

Hitherto no medical treatment has been found which will regularly prevent acute mastitis proceeding to abscess formation. X rays and infra-red rays have been used to hasten resolution, and some surgeons prefer aspiration of the established abscess to straightforward incision and drainage. In 1944 Fraser [2] reported on a series of cases of breast abscess treated by aspiration combined with penicillin irrigation. The results were disappointing, but he suggested that when penicillin became more plentiful it should be given parenterally to cases of acute mastitis at the earliest possible stage. Hodgkinson and Nelson [3] have now treated 24 cases in this way and claim that abscess formation can thereby be prevented or aborted. They gave each case a total dosage of 840,000 units by intramuscular injection divided into 25,000 units three-hourly for the first 72 hours and 15,000 units three-hourly for a further 48 hours. Their results were excellent, but even with this treatment it does not seem possible to allow the mother to continue breast-feeding. Another drawback is the difficulty of giving penicillin parenterally except in a hospital.

Institutional outbreaks of acute mastitis and associated conditions, such as pemphigus neonatorum, have so far proved extremely resistant to the usual methods of control. Even heroic measures, such as the complete closure of wards for a fortnight or longer, have sometimes failed to end the trouble. It may be that staphylococcal infections in hospital wards, nurseries, and the like could be prevented with penicillin mists and sprays. Chronic nasal or other carriers of staphylococci may also be found to yield readily to local applications of penicillin. There is in fact a prospect that penicillin will be the answer to one of the biggest problems of institutional midwifery.

TRANSFORMATION OF E.M.S. HUTS

IN these days of austerity and improvisation we are bound to consider the use of Emergency Medical Service huts for the hospital purposes of peace. The Ministry of Health, in a supplement to their *Monthly Bulletin* for February, have now published plans for reconstructing these huts, the aim being to demonstrate what can be done by internal alterations without fresh building. The supplement provides useful patterns on which modifications can be based. For instance, if it is desired to turn the general-purpose hut—or pair of huts—into a special unit for maternity cases the plans are here. Similarly, plans have been drawn up to cover the needs of sick children, the chronic sick, and the tuberculosis unit. The general medical and surgical wards are included, and the operating-theatre suite; and the hospital staff has not been forgotten, for we are shown what might be done to replace the cubicles in which so many nurses have been spending a rather uncomfortable six years.

Often during the war as many as 36–40 patients had to be crowded into one hut. Such numbers were far too high for convenience and safety, and under the proposed reconstruction the maximum number in any one hut would not exceed 20. As wards the huts have been criticised on account of (*a*) the absence of single rooms where an isolation case could be nursed; (*b*) the insufficient number and size of the ancillary rooms, such as ward kitchen, sluice-room, linen-room, and other usual offices; (*c*) the width—24 feet—of the standard hut; (*d*) the position and spacing of the windows; (*e*) the absence in some hutted hospitals of covered ways between the huts; and (*f*) the system of heating. The plans are ingeniously contrived to overcome most of these objections. The authors rightly dislike the existing method of warming the huts, most of which are heated by means of the slow-combustion stove, each with an iron flue passing straight up through the roof. It is not too much to say that these stoves have proved themselves dirty, smoky, and exasperating to patients and staff alike; they require intelligent stoking every four hours, and this operation cannot be performed without noise and dust. Though tolerated during the war, out of grim necessity, they must in any reconstruction of the huts be replaced by some form of central heating, and we are glad to see that in all the plans under review, with one exception, they have disappeared. The exception is in the emergency plans for tuberculosis units, for which two sets of plans are exhibited. One set attempts "really good conditions which could be accepted with some satisfaction until new building can take place"; these plans are good. The second set are to be regarded as "emergency plans to suit the present conditions" when labour and materials are still so difficult to obtain, and in these the slow-combustion stoves are retained. This sop to the cerberus of utility mars an otherwise thoughtful and practical piece of work, on which the authors, Dr. T. S. McIntosh and Mr. H. R. Coales of the Ministry of Health, are to be congratulated.

If an addendum to this supplement to the bulletin should appear—which can surely be expected if ministerial practice and tradition are any guide—*let it contain* a plan to construct a real covered way between the huts.

WATER METABOLISM IN PREGNANCY

IT has long been believed that the maternal tissues retain water during pregnancy, and Chesley [1] has made a competent review of the subject. The evidence for water retention rests largely on observations made on women, and but little on animal experiment. It has been repeatedly shown [2] that the blood-volume is increased in pregnancy, and that the increase is mainly due to plasma—a fact which, incidentally, may suggest anæmia although the gross quantity of hæmoglobin in the body is greater than normal. Since the plasma represents but one part of the extracellular fluid of the body, it might be suspected that the volume of the other part—the interstitial or tissue fluid—would also be increased. By measuring the dilution of injected sodium thiocyanate, Chesley [3] has shown that such an increase almost certainly occurs. This substance is believed to spread evenly through the plasma and interstitial fluid, but not to enter the cells. Since it is very slowly excreted by the kidneys, the final concentration which it assumes should give a good estimate of the total volume of extracellular fluid. On subtracting the volume of plasma, ascertained by other means, the volume of interstitial fluid remains. The size of the body is, of course, increased by the hypertrophied uterus and mammary glands, and there must be a corresponding increase in interstitial fluid; but even allowing for this, there is a balance of 2 or 3 litres which must be accommodated outside the reproductive tract. Balance experiments have shown that sodium is retained during pregnancy, and it seems reasonable to associate the two phenomena, although if the sodium were all osmotically active it would account for more than the volume of water in

2. Fraser, D. B. *Ibid*, 1944, i, 523.
3. Hodgkinson, C. P., Nelson, R. E. *J. Amer. med. Ass.* 1945, 129, 269.

1. Chesley, L. C. *Amer. J. Obstet. Gynec.* 1944, 44, 565.
2. Dieckmann, W. J., Wegner, C. R. *Arch. intern. Med.* 1934, 53, 71. Albers, H. Normale und Pathologische Physiologie im Wasserhaushalt der Schwangeren, Leipzig, 1939.
3. Chesley, L. C. *Surg. Gynec. Obstet.* 1943, 76, 585.

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question. Freyberg, Reekie, and Folsome [4] have shown very strikingly that administration and deprivation of salt cause respectively an increase and decrease in the weight of the same pregnant woman. Two factors appear to throw the burden of this extracellular water more on the interstitial fluid than on the plasma. They are the diminished colloid osmotic pressure of the plasma and the rise in venous pressure in the legs, convincingly demonstrated by McLennan [5] by direct manometric readings on the femoral vein in recumbent subjects.

A discussion on the subject at the section of obstetrics and gynæcology of the Royal Society of Medicine on Feb. 15 was opened along these lines by Prof. W. H. Newton. Dr. G. W. Theobald, following, drew attention to a reduction in the efficacy of water diuresis during pregnancy which was very similar to that produced by long standing. He stressed the importance of damage to the endothelium of capillary blood-vessels in the production of œdema, a point which was endorsed by Prof. W. C. W. Nixon and Prof. F. J. Browne. Professor Browne also pointed out that the degree of hypoproteinæmia usually encountered was insufficient to produce œdema, while Dr. Theobald maintained that an increased sodium intake could not be held to determine œdema, because the amount retained during pregnancy was large enough to account for a much greater volume of water than was ever found in practice. The œdema of severe hypoproteinæmia was touched upon by Dr. Frederick Bunjé in recounting his experiences as a prisoner-of-war of the Japanese, and Professor Nixon described the effects of vitamin-B_1 deficiency on toxæmia.

It is probably safe to say that a certain amount of water is retained during pregnancy, and although no one of the various factors mentioned above is alone sufficient to determine it, the evidence from all together is irresistible. The amount probably varies greatly, and it is difficult to say whether some cases of actual œdema are "physiological" or not. It can scarcely be doubted that the tissues are prone to œdema at this time, and that, whatever the decisive pathological lesion may be, it finds the ground well prepared. In view of the known effects of steroid hormones on the metabolism of water and salt, it is not unlikely, as Professor Browne suggested, that the fundamental change is endocrine in nature, but at present there is no direct evidence of this.

REPATRIATION AND RESETTLEMENT

THE Services have their own organisations to help in the social reintegration of the 140,000 men who spent years as prisoners-of-war either in Europe or under even harsher conditions in the Far East, and the E.M.S. has a special unit at Dartford for returned prisoners with neurosis. Discussing their experience of these organisations, speakers at the meeting of the section of psychiatry of the Royal Society of Medicine on Feb. 12 made it clear that the resettlement problems of prisoners-of-war are in fact much the same as those of other repatriates; there was general agreement that after two years or more away from home, whatever the cause, most people are likely to encounter difficulties on their return. This is a finding with wide implications for any organisation whose staff have tours of duty overseas.

The problems set by repatriated officers and men could not be met quickly or effectively enough by the usual resources of retraining or re-employment, or by medical help and advice. In consequence, as early as 1942, Army psychiatrists and psychologists began to give these problems special consideration. Diagnostic investigations and a follow-up study led to the development of a pilot unit which worked out, in considerable detail, methods of assisting reorientation and resettlement. In the Army civil resettlement scheme which followed these preliminary trials, the men who attended the civil resettlement units did so as volunteers, because the active coöperation of the repatriates themselves was essential for success. Dr. Maxwell Jones's description of the work of his colleagues and himself in the E.M.S. unit for repatriated prisoners-of-war suffering from neurosis showed close agreement with the findings of the Army group. In both schemes the problems of resettlement were handled by forming special transitional communities related in an unusually intimate way to the industrial and social life around them. In addition, both schemes relied primarily on group methods for the recognition and solution of emotional troubles. The development of these organisations has been in line with recent industrial experience of rehabilitation. For the view is gaining weight that it seldom pays to uproot people from their social environment unless this is absolutely necessary. In many progressive factories, for example, even a special rehabilitation shop is sparingly used, and whenever possible injured men go back to work with their own group in their own shop, although not always at the same job. Once a man has been uprooted from his social environment the re-formation of his social connexions needs and deserves more attention than our hospital or medical organisation has hitherto given it. A prominent industrialist recently remarked that it took his injured workmen longer to recover from being in hospital than it did from being injured. The use of the word "resettlement" to express the position which is slowly being recognised in the field of "reablement" may represent a significant gain in insight. The usual practice by which convalescent homes are isolated communities which take no part in the social life around them—a life which in any case is often very different from that of the patient's home—has been reversed in the civil resettlement units, for these have been placed as far as possible within communities which resemble those to which those who pass through them will shortly return.

4. Freyberg, R. H., Reekie, R. D., Folsome, C. *Amer. J. Obstet. Gynec.* 1938, **36**, 200.
5. McLennan, C. E. *Ibid*, 1943, **45**, 568.

M.D.G., R.A.F.

ON Feb. 28 Air Marshal Sir Harold Whittingham retired from the appointment of medical director-general in the Royal Air Force, held by him since March 1, 1941. These five years of stern endeavour have suited his temperament. His energy in the interests of his Service has been phenomenal. By 1937 German workers in aviation medicine had gained an appreciable advantage which demanded immediate challenge. A team constituted as the Flying Personnel Research Committee was formed in February, 1939, with Air Commodore Whittingham as chief executive officer. Such a body, separated from practical needs by a pallisade of departmental files, is under serious handicap. Whittingham, however, made sure that delays in medical policy were minimal, and by his capacity for driving in the right direction gained the confidence of all who worked with him, drawing the executive and medical branches together in one purpose. His wide experience of research strengthened his position, and probably no-one else could in the time have gone so far to satisfy the requirements of aircrew through the medium of applied physiology. Problems of blackout during high-speed manœuvres in aircraft, of flying clothing, of exposure connected with life-saving devices at sea, of air-sea rescue, of night vision, of auditory function, of casualty evacuation by air—all these passed through his hands for criticism and guidance. Simultaneously there was much to be considered if the health of ground personnel in all theatres of war was to be maintained: the wide-flung air arm needed a mobile health service at its side; and this also was achieved. Whittingham holds strong views

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about the approach to research within the Service, believing that success is most likely to be attained by a combination of workers in the field, as represented by the flying personnel medical officers, who perform their duties under active-service conditions and keep in touch with the Royal Air Force institute of aviation medicine. This policy has been justified by results. When controversy or rivalry has developed, he has been unperturbed; for he maintains that they bud only in the garden of good fruits, and that lack of them is a sure sign of failure in achievement.

SELECTION TESTS FOR NURSES

OUR annotation of Jan. 12 on selection tests for nursing candidates is described by the *Nursing Times* (Feb. 9) as depressing. Evidently therefore it needs to be amplified. The proposal of the Royal College of Nursing that selection tests should be introduced into the profession strikes us as forward-looking and sound; but we are anxious that the tests should be applied *within* the profession and not used as a means of excluding candidates. Our annotation suggested that a simple, barely literate girl may sometimes have "the ability to make a patient comfortable." The *Nursing Times* feels that this is setting rather a low standard of efficiency for the nurse: "what is the use of making a patient comfortable," it asks, "if you kill him with an overdose of morphia or paraldehyde, because you have not the ability to give him the correct dose?" Not much, certainly; but perhaps the nurse in question should not have been entrusted with the measurement of doses: her nursing ability may be of a different but equally valuable order.

The country's health services can be run by relatively few doctors, but without great numbers of nurses it will break down. Nursing offers such wide variety of duties and interests that it should be possible to find room in the profession both for women with first-rate intellects and for those whose chief recommendation is a competent pair of hands. This is not the moment to put even small obstacles in the way of the girl who thinks she wants to nurse.

REACTIONS TO PENICILLIN

ONE of the remarkable features of penicillin therapy has been the rarity of reactions, but two articles in this issue demonstrate that troublesome reactions are not unknown. How far these are due to impurities must remain doubtful until pure penicillin is generally obtainable. Commercial penicillin now contains some 30% of impurities, whereas in the early days it contained 80–90%, and increasing purification has certainly made reactions increasingly rare. Even now, however, Cormia and others[1] have encountered reactions severe enough to necessitate the discontinuance of penicillin therapy in 0·5% of 2000 U.S. soldiers given long courses of the drug for various infections. Reactions to penicillin—like those to the sulphonamides—may appear either soon after administration begins, where the patient is "naturally" hypersensitive or has been sensitised by a previous course of penicillin, or some days later when the patient has acquired sensitivity during the course of treatment; commonly, as in the cases reported by Major Haswell and Captain Wilkinson, the reaction will then appear, like serum-sickness, after administration has ceased.

It seems fairly certain—though the result of skin-tests are not conclusive—that penicillin itself can produce a contact dermatitis after protracted application. Pyle and Rattner,[2] and Barker,[3] described cases in doctors and orderlies who had been making up penicillin solutions for a long period; patch tests with crystalline penicillin were positive in Pyle's cases. Cormia and his colleagues report a case of severe urticaria and angio-neurotic œdema, leading to pulmonary œdema, beginning 24 hours after the local application of penicillin ointment in a soldier who had received two courses of parenteral penicillin in the previous month; these had presumably produced sensitivity. Of the reactions produced by intramuscular injection by far the commonest form is urticaria; among the 209 surgical cases treated with penicillin by Lyons[4] in 1943, urticaria, sometimes accompanied by fever and abdominal colic, developed in 5·7%. Cormia and his colleagues also mention a reaction resembling serum-sickness; also acute syncope, transient miliaria-like eruptions, erythematovesicular eruptions at times simulating dermatophytosis, erythema nodosum, and epididymitis. They give one example of epididymitis arising in the penicillin therapy of early secondary syphilis and quote the 10 examples of epididymitis which Rosenberg and Arling[5] encountered in 65 cases of meningococcal meningitis treated with penicillin. From a small study with intradermal tests they conclude that fungus diseases of the skin predispose to penicillin reactions.

Lyons takes the view that urticarial reactions are so transient that they can usually be ignored and penicillin therapy continued in spite of them; this can hardly apply, however, where there is a severe general reaction. Macey and Hays[6] have obtained good results in severe reactions with intravenous infusions of 50 c.cm. of 50% dextrose solution.

1. Cormia, F. E., Jacobsen, L. Y., Smith, E. L. *Bull. U.S. Army med. Dep.* 1945, **4**, 694.
2. Pyle, H. D., Rattner, H. *J. Amer. med. Ass.* 1944, **125**, 903.
3. Barker, A. N. *Lancet*, 1945, **1**, 177.

TWO MONTHS' NOTICE

SINCE last July the medical press has in general declined to publish advertisements giving less than four months' notice of a permanent appointment. This has been done to ensure that no such post shall be filled until doctors serving overseas have had a chance of applying for it. Circumstances, however, have changed considerably since the four months' rule was made: a large proportion of the possible candidates have now been released, and the others are mostly more accessible than they were while the Japanese war was still in progress. Inconvenience is caused to all parties by any unnecessary delay in filling vacancies, and it is felt that the time has come when the period of notice requested of employing authorities should be reduced. The way in which these authorities have fallen in with the views of the profession is much appreciated, and we are glad to inform them that advertisements will henceforward be accepted giving two months' notice.

Dr. J. D. BARRIS died on Feb. 23 at St. Bartholomew's Hospital, London, to which he was consulting physician-accoucheur. He was 66 years of age.

Dr. J. G. PORTER-PHILLIPS, who died on Feb. 24 at the age of 68, had been superintendent of the Bethlem Royal Hospital for 30 years when he retired in 1944.

4. Lyons, C. *J. Amer. med. Ass.* 1943, **123**, 1007.
5. Rosenberg, D. H., Arling, P. A. *Ibid*, 1944, **125**, 1011.
6. Macey, H. B., Hays, T. G. *Nav. med. Bull. Wash.* 1945, **45**, 1143.

SPEAKING at Bolton last week Mr. R. MacDonald Murray, a member of the council of the Pharmaceutical Society, said that the future health of the country demanded that all drugs and medicines should be distributed through registered pharmacies where there must always be a qualified chemist in charge. The chemist's shop in his opinion was too well established in the life of the community for any revolutionary changes under a National Health Service. In industrial districts especially, it would remain the medicine cupboard of the poor.

THE SCIENCE AND ART OF MEDICINE.—Sir Lionel Whitby's lecture on this topic (see *Lancet*, Jan. 5, p. 22), which he delivered on Dec. 5 on his inauguration to the regius chair of physic in the University of Cambridge, has now been published by the Cambridge University Press (Pp. 24. 1s. 6d.).

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Special Articles

MEDICAL OBSERVATIONS IN AUSCHWITZ CONCENTRATION CAMP

LUCIE ADELSBERGER
M.D. Amsterdam

I WAS arrested in May, 1943, and was sent to Birkenau concentration camp. This was the climax to a series of restrictions that began in March, 1933, with my removal from a post at the Robert Koch Institute, Berlin, because I was a Jewess. I was employed as an internee woman doctor, first at Birkenau, which was one section of the Auschwitz camp; and later, between January and May, 1945, at Ravensbrück and Neustadt camps. This report is concerned mainly with the Birkenau camp; a brief description of conditions there will first be given, as a background to the medical report which follows.

It is as difficult for a former internee to write objectively of a concentration camp as it is for anyone who has not been interned to grasp the horror of existence in such a place. One feature, common to all the camps, was gross overcrowding. Between 500 and 1000 people were accommodated in blocks about 100 feet long by 20 feet wide. Treble-tier beds were provided, in each of which 25 to 30 persons lay. Sanitary accommodation was always inadequate, and there was a constant shortage of water. Louse-infestation was universal, and scabies rampant. Hunger was a constant torment: the official daily ration at Auschwitz was one litre of watery soup; 250 g. of bread; and 20–25 g. of margarine or sausage or imitation honey. Workers received twice weekly a supplementary ration of 500 g. of bread and 50–100 g. of sausage. These quantities became in time insufficient to support life, and the German camp doctors admitted that a prisoner could not hope to survive on them much longer than six months. In any case, the full amounts were rarely received, owing to theft and dishonesty among the prisoners themselves. Existence in the camps consisted in a continual struggle to survive and to avoid the brutalities of the S.S. guards and of those prisoners, usually depraved types, that had been selected by the camp authorities for positions of authority. Dominating all was the dread of death by gassing or burning.

This procedure was entered in the books against the victims' names as "transferred for special treatment." Victims were normally selected by the camp doctor. From the new arrivals were automatically chosen for immediate death the elderly, the sick, the feeble, and all children along with any women accompanying them: percentages varied; in some cases whole transports were sent direct to destruction, as, for example, a convoy of women who arrived from Norway on Dec. 1, 1942, and 50,000 Italian Jews who came between Aug. 1 and Aug. 8, 1943. Of 650,000 Hungarian Jews who arrived between May and July, 1944, 80% were gassed. At this time the children in the camp containing gipsies played at "burning Jews"; and one very gifted deaf-mute child made sketches of the furnaces aglow and the human masses inside them. In the camp, the choice was made by picking haphazardly on a block; from this the thin, the weak, and those with scabies or œdema were removed and placed in the selection block, where they waited, in full knowledge of their fate, for transport to the crematorium. Every Jewish prisoner regarded his life as already forfeit, and merely awaited his turn. From the medical room selections were made in a similar way, but with more terrifying regularity.

The hospital was originally no better than the rest of the camp; overcrowding, undernourishment, and lack of hygienic arrangements were as striking here as anywhere else. Slowly conditions were improved until, by 1943, the buildings had been cemented, each patient had a bed, and some supplementary foods were available: from squalor emerged a state of comparative order and decency; this was achieved only by "organising," which implied the exchange of patients' food for equipment and service. The supply of white bread to the hospital area continued up till January, 1945: it was ironical that patients shortly to be killed by gassing should have been granted a luxury long denied to the rest of Europe. There was, too, something grotesque in the attitude of the camp doctors to the hospital. They took great interest in the patients, trying to obtain for them all necessary drugs; often they appeared to be prompted by humane and scientific instincts. They gave earnest lectures to the internee doctors on the treatment of diarrhœa and famine-œdema, in full view of the burning furnaces that consumed the victims of their choosing. One doctor demanded that all gipsy children should be cured of conjunctivitis in a fortnight; he then promptly sent them all to the gas chamber. These doctors showed an extraordinary respect for external appearances; for example, they laid great stress on the treatment of disfiguring skin conditions, such as scabies, but showed no interest in the advanced tuberculosis which many of these patients had.

INFECTIOUS DISEASES

As might be expected, infectious and deficiency diseases formed the greater part of the hospital's work.

Typhus.—The impression was that well-nourished patients and especially those taking much carbohydrate (including Polish nursing staff who received gift parcels) were more prone to complications than other patients: in particular, circulatory collapse, parotitis, and pneumonia were noted. The prognosis in these seemed worse than in those who, though thin, were not grossly emaciated. Signs taken as indicating a grave prognosis included a very dry brown or brownish-black tongue at the onset of the illness; a hæmorrhagic rash; diarrhœa before or during the crisis; and fibrillary tremors in the muscles of the face or hands, which usually betokened the onset of encephalitis—no rare complication in this series. The case-mortality from typhus was 15–20%.

Diarrhœa.—This condition was the most feared of any in the camp, for it claimed by far the most victims. It was found impossible to differentiate clinically the infective from the non-infective cases. Pathogenic organisms were isolated with surprising rarity, and no constant strain was found.

Typhoid and Paratyphoid.—The enteric infections often ran abortive or atypical courses. The total number was amazingly small. Patients in poor general condition showed atypical temperature charts, a ready tendency to diarrhœa with rice-water stools, sensory changes, and leucopenia; but in them no splenic enlargement or other of the usual signs was found.

Dysentery.—Diarrhœa with blood and mucus in the stools was rare. The low incidence of dysentery was confirmed bacteriologically.

Measles, chickenpox, and typhus were among the conditions to which all fell victim on first contact. On the other hand, rhinitis, sore throats, and pneumonia were extremely uncommon. Considering the fact that all cases in hospital were treated in close proximity to each other and without trained nurses, there was remarkably little cross-infection of any infective disorder.

An epidemic of scarlet fever spread quickly in a group of recently arrived Hungarian Jews, but hardly affected the prisoners who had been some time in the camp. The water was heavily contaminated with *Bact. coli*, and recent arrivals could not safely drink it; but after a time prisoners were able to take it in gradually increasing quantities without ill effect. The impression is that subclinical or abortive conditions led to the development of increasing immunity. Resistance seemed to be highest in those who, though on an inadequate diet, had not yet reached the level of gross hunger and malnutrition. The psychic factor may also have played some part;

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the increased will to survive that sprang from the dangers in the camp may have had a useful effect during illness.

DEFICIENCY DISEASES

Malnutrition.—As a result of starvation some patients developed famine-œdema, whereas others became dehydrated. The patients with famine-œdema had enormously swollen and tense pale skin. When able to speak, they complained of exhaustion; precordial pain and pains in the muscles and bones; constant thirst; disturbances of taste; and a longing for potatoes. Tachycardia, circulatory weakness, apathy, and stupor were among the signs recorded. Paræsthesiæ or anæsthesia of the extremities and signs of paralysis were also noted. Dehydrated patients presented the same symptoms, but the signs were different: these cases often had a strikingly dark, almost bronze, coloration, resembling that seen in Addison's disease. They showed a well-marked diuresis, with an excess of fluid output over intake: at times, when my maximum intake was 0·25 litre of soup and 0·5 litre of coffee, the daily excretion of urine was between 1 and 2 litres. With their thin, dry, wrinkled skins, which remained raised when lifted, patients in this group were like skeletons held together by a loose covering of flesh. The occurrence of œdema in dehydrated cases was a striking phenomenon and presented a first-class problem.

At the Neustadt/Cleve camp, the diet contained no salt and was particularly scanty, consisting of only 100 g. of bread, 10 g. of margarine or artificial honey, and 0·25–0·5 litre of soup of poor calorie value: here starvation states developed rapidly, and many deaths occurred. Among these people œdema was rarely seen; but after liberation some developed œdema within a few days of being placed on a good mixed diet, and in my case some œdema persisted for eight weeks. Soapy stools were also observed after liberation.

The most frequent complication of starvation was diarrhœa. No doubt more than one factor contributed to its production; but many cases responded promptly to the sulphonamide drugs. Some cases of famine-œdema with diarrhœa were relieved by a single injection of vitamin B_1. No similar response was noted in dehydrated subjects.

Noma.—In 1943 there was a widespread outbreak of noma, confined almost entirely to children. They showed deep and extensive ulceration of the mucous membranes of mouth and cheek, with slimy necrotic holes inside the mouth, upper lips missing, and holes in the cheeks: this did not deter them from eating anything on which they could lay their hands. At that time the disease was inevitably fatal: later, Prof. B. Epstein, working in the camp, clarified the problem of the condition's pathology; and by introducing treatment with a combination of sulphonamides and nicotinic acid provided an effective cure. At the same time, permission was received to give these children special high-calorie diets, with meat and added vitamins. It was then possible, with nicotinic acid and injections of 'Globucid' (sulphanilamido-ethyl thiodiazole), to arrest a severe gangrenous stomatitis, even when œdema of the cheek indicated an impending perforation: in a few days a line of demarcation could be seen between the necrotic area and the adjacent healthy tissues, and the necrotic slough then separated. It is not generally known that noma may occur elsewhere than in the mouth: similar conditions of slimy ulceration with a tendency to progressive tissue destruction and perforation were noted in other parts, especially on the vulva; these ulcers were at first mistaken for diphtheria; but their rapid response to treatment as noma lesions established the true ætiology.

Pellagra.—The only positive method of establishing the diagnosis of pellagra was by the skin changes on the limbs and chest: the discoloration was often pronounced and of a darkish brown tint; but at times it was initially bright reddish-brown with sharply defined margins. The picture was otherwise one of advanced famine-œdema with profuse diarrhœa, manifestations of neuritis, pains in the body, and poor appetite. In many of the milder cases the diagnosis was probably missed.

The first case to be diagnosed was a Russian woman in poor general condition, who complained of pain and weakness in the legs, tenderness of the bones, body pains, and exhaustion. She had had diarrhœa for some time and had noticed impairment of vision with night-blindness. She showed well-marked generalised œdema with sharply demarcated patches of erythema between the breasts and in the axillæ. The diagnosis was established only when darkish discoloration of the skin developed on the erythematous patches. Similar areas of discoloration later appeared on the legs.

It would seem that the cases at Birkenau were mixed syndromes, due to deficiency of the whole vitamin-B complex, and especially of B_1 and B_6. Treatment was effective only when massive doses of thiamine and nicotinic acid were given with a supplementary ration of milk. When the incidence of pellagra was appreciated, a new view was taken of "sunburn" cases in which persistent ulcers of the shins had hitherto resisted treatment.

BLOOD CHEMISTRY

Evaluation of the blood-sedimentation rate (B.S.R.), total protein, ascorbic acid, sodium, potassium, and calcium were made on seven groups of prisoners (see table).

BLOOD FINDINGS IN VARIOUS GROUPS OF INTERNEES

Group	B.S.R. (mm. in 1 hr.)	Total blood protein (g. per 100 c.cm.)	Blood-protein coefficient	Blood ascorbic acid (mg. per 100 c.cm.)
Normal	6–10	7·5–9·0	1·5	1
A	10–15	7·5–9·0	1·5	..
B	6–10	7·5–8·5	1·5	Usually low
C	10–20	7·0–8·5	1·5	Low
D	20–30	6·0–7·0	1·3	Low
E	60–80	5·0–6·0	1·1–1·3	Low
F	60–80	4·0–5·0	1·1–1·3	Low
G	105–120	About 3·5	0·92–0·95	..

A = New arrivals, recently arrested, and previously detained not more than one week in any camp.
B = "Aryan" Polish women in receipt of food parcels: well nourished.
C = Prisoners employed at least six months in the kitchen.
D = Jewish prisoners from the sewing and weaving shops, who had been living on the official rations only. Most prisoners in this group did not survive long beyond six months.
E = Dehydrated starvation cases.
F = Cases of famine-œdema.
G = Pellagra cases.

Patients with clinical or radiological evidence of tuberculosis were excluded; an attempt was made to exclude cases with other infections, and to accept only subjects with normal blood-pictures. Tests were repeated at intervals; control and check tests gave constant results, except in the ascorbic figures; and the values corresponded with those anticipated by clinical assessment. Since we were not allowed to retain any documents, only the averages, which were committed to memory, can be recorded here.

It will be seen that the B.S.R. increased parallel with the development of starvation. Blood sodium, calcium, and potassium were all within normal limits in all groups. On the other hand, the ascorbic acid content was nearly always subnormal. The blood-protein results are of great interest: in new arrivals, in the kitchen staff, and in Polish women receiving parcels the total blood protein was normal, and the albumin-globulin ratio was undisturbed. In the malnourished patients from the weaving sheds, the total protein was slightly decreased to about 6–7%; the depression was chiefly of the albumin component, and the protein coefficient was about 1·3. This tendency became progressively more pronounced in the thin, dehydrated patients, the cases of starvation œdema, and the cases of pellagra.

SUMMARY

A brief account has been given of life in the Birkenau section of the Auschwitz concentration camp, and of the

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clinical conditions encountered in two years' work at the hospital camp.

There was a high incidence of some infective diseases, notably typhus: the incidence of dysentery, enteric, and respiratory infections was remarkably low.

It appeared that prisoners developed an immunity to some infections: this apparent immunity was most evident in those who had been a short time in the camp; it was not observed in well-nourished recent arrivals, nor in starved patients who had been some months in the camp.

An extensive outbreak of noma in children was observed. The condition affected other parts than the mouth, and responded rapidly to treatment with sulphonamides and nicotinic acid.

With starvation, patients developed either famine-œdema or dehydration with excessive fluid output.

Many cases of deficiency in vitamin B were encountered. There were some established examples of pellagra: otherwise the deficiency appeared to be of the whole B complex.

Both infective and deficiency disorders ran atypical courses in malnourished subjects.

GENERAL MEDICAL COUNCIL

(*Concluded from p. 282*)

ALLEGED THEFT OF PATIENTS

IN the case heard at the extra session of the General Medical Council on Feb. 12, and briefly summarised in THE LANCET of Feb. 23 (p. 282), Dr. W. S. Dixon, Dr. John Trotter, and Dr. R. C. Thomson, all of Horden, co. Durham, were charged with appropriating to their practice patients who rightfully belonged to the practice of Dr. Myer (or Michael) Rooms, in breach of an agreement made between the parties. It was said that these three practitioners included about 76 insured patients of Dr. Rooms' in their own lists without the patients' consent; that they accepted and retained contributions paid to a colliery club by about 26 patients of Dr. Rooms' for medical attention for their dependants, without the consent of the patients; and that they collected through an agent and retained contributions paid to a private club by about 20 patients of Dr. Rooms' for providing medical attention for their dependants, without their consent. Other charges against the first two respondents alleged the deflection of individual patients, or intending patients, of Dr. Rooms' to their own practice and to that of another practitioner. These acts, it was alleged, constituted infamous conduct in a professional respect.

Before the case was presented, Mr. Oswald Hempson, who defended Dr. Dixon and Dr. Thomson, submitted that, since the agreement had an arbitration clause and the matters charged were all susceptible to arbitration under the agreement, the council should postpone consideration of the case until it had been taken to arbitration. The council, however, decided to hear the case forthwith.

Mr. A. A. Pereira, opening the case for the complainants, described the action of the respondents as a plain theft of about 76 patients and 47 families of patients, without their consent and against their will. Dr. Rooms had purchased a practice in Horden in 1935. At that time Dr. Dixon had been in practice in Horden, and he was joined later by the other respondents. This was a purely industrial area. Until 1939 nearly all the male population had been employed in the local colliery. They were insured persons, and their families' medical attention was paid for by colliery or private clubs. Dr. Rooms had a surgery in Horden and a branch surgery in Blackhall. The respondents had patients in Blackhall as well as Horden, but no branch surgery there. Dr. Rooms had joined the Territorial Service of the R.A.M.C. at the beginning of 1939, and in September he had been called up. At first he had employed a locum tenens, but had not found the arrangement satisfactory. After a conversation with Dr. Dixon, he had entered into the agreement mentioned. The terms had been settled entirely by Dr. Dixon's solicitors. This was signed on Dec. 1, 1939, and provided that Dr. Dixon should look after Dr. Rooms's patients and interests for a fee of six guineas a week. The three respondents, described as the "acting practitioners," agreed to conduct the practice of Dr. Rooms, who was called the "serving practitioner." The agreement was terminable at 28 days' notice. The profits of the practice were to be paid to Dr. Rooms's wife as his agent. No implication of partnership between the respondents and Dr. Rooms was to arise out of the agreement. The practice was to be carried on in Dr. Rooms's name; all information was to be given to his agent; the acting practitioners were not to collect any monies due to Dr. Rooms, whose own collector would do this. They were not required to keep any records concerning the patients, other than clinical notes, nor to attend any patient of his for their own benefit.

In 1942 Dr. Rooms went overseas. During his absence many changes took place: new panel patients came as children grew up; young men married, and their wives and families became club patients and chose their own doctors. In all such cases it was the respondents' duty to see that such persons were put on the panel of Dr. Rooms. Dr. Rooms left all his records at the surgery of the partners, so that the proper allocation of patients could easily be ascertained.

After the arrangement had worked well for some time, Mrs. Rooms had found that she could not get necessary information. A quarrel had taken place and friendly relations had been entirely severed. As, however, the two collectors of the respective parties had worked together, the partners could easily have straightened matters out. In December, 1944, Dr. Dixon had become ill and had actually given notice of termination, but he had agreed to continue at work subject to a small variation in the agreement, which had been accepted by Mrs. Rooms: he was no longer to attend the branch surgery, though he would attend patients at Blackhall. The practice and income had been declining, so Mrs. Rooms wrote to her husband, who came home in January, 1945, on compassionate leave. This had been granted on the ground of his wife's health, and not at all because of the difficulties with Dr. Dixon. The state of affairs only emerged gradually, and after two conversations with Dr. Dixon Dr. Rooms had given notice of termination, dated March 7, 1945. At first, on his return, Dr. Dixon had told him that any patients who belonged to Dr. Rooms would go on his list, and Dr. Rooms had been satisfied; but he had become perturbed by what he heard from some of his patients, and on March 31 he had removed all his records from Dr. Dixon's surgery. Dr. Rooms later found that many of his patients had drifted into Dr. Dixon's hands, and that in five years only 4 new names had been given to his collector.

Dr. Rooms and Mrs. Rooms corroborated in evidence Mr. Pereira's opening. Cross-examined by Mr. Hempson, Dr. Rooms said he had heard that Dr. Dixon had been before the council previously on a complaint of canvassing made by a practitioner. [The charges were found proved and judgment was suspended, the council finally deciding not to erase Dr. Dixon's name.] Dr. Rooms maintained, however, that this knowledge had not prejudiced him. He put in insurance cards and other documents purporting to show that patients of his, or who should have been his, had been registered as patients of the partners. A number of Dr. Rooms's patients gave evidence that they had not wanted to change their doctor and had no desire that their contributions should go to anyone else but to Dr. Rooms.

Mr. T. H. Jones, Dr. Rooms's collector, confirmed that only 4 new panel patients' names had been given to him during the war.

At the close of the complainant's case, Mr. Hempson submitted that Dr. Dixon and Dr. Thomson had no case to answer, but the President, advised by the legal assessor (Mr. Douglas Bartley), ruled that the case should proceed.

Mr. Aiken Watson submitted on behalf of Dr. Trotter that no evidence of stealing patients had been given, and that evidence tending to show breach of the agreement was not relevant to the charge, which alleged a criminal offence. Dr. Trotter could not, in these quasi-criminal proceedings, be held responsible for the acts of his partners. This submission also, however, was rejected.

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Dr. Dixon, giving evidence on his own behalf, said that he was chairman of the local division of the British Medical Association and a member of the panel committee. He had at all times looked after Dr. Rooms's patients to the best of his ability. He had not wittingly done anything unprofessional. He had amplified all Dr. Rooms's lists. The partnership panel contained about 4000 names; its colliery club practice 1700 or 1800. Although many dependants of panel patients gave their cards to the father's doctor when they went to work, this was not by any means an invariable practice, and it was common for as many as three doctors to attend different members of the same family. If an unknown patient came to him with a panel card, he would leave the selection of doctor entirely to the patient. Many patients, especially in the war, merely handed their cards to the dispenser, and then one of the partners would sign the card and it would be sent to the office of the insurance committee. Cards of patients wishing to go on to Dr. Rooms's list had been signed by a partner "per pro" Dr. Rooms. Dr. Rooms's patients had been few compared with those of the partnership practice. The numbers of all classes of patients had much diminished in the war, as workers of both sexes left the area to go to the Army or into war factories.

The suggestion that the agreement between the partners and Dr. Rooms should be made had originally come from Dr. Rooms. The agreement had followed the lines of the B.M.A. protection scheme and had been settled by an independent solicitor. He had conscientiously endeavoured to adhere to its provisions. After Dr. Rooms had been called up he had never visited the practice, though he had been in the country for some time before going overseas. All receipts had been accounted for, including fees for anæsthetics, minor operations, and the like, though strictly speaking Dr. Rooms was not entitled to these. In 1944, when Dr. Dixon had been taken ill, Dr. Rooms had written begging the partners to continue to manage his practice. They had had to give up the Blackhall part, and with Mrs. Rooms's consent had referred the patients to Dr. Stokes, a local practitioner, for attention. Throughout the war pressure of work had been so great that meticulous record-keeping had been impossible, and inevitably some dependants had not been recognised as Dr. Rooms's.

When Dr. Rooms had returned he had said that his practice had gone down, and Dr. Dixon had replied that this was true of the practices of most doctors who had been away. When preparing to hand back the practice, the partners had been through the medical cards, and had found some patients who, by their names, might have belonged to Dr. Rooms's families. They had put all the doubtful cards on one side, and had given Dr. Rooms the benefit of every doubt. On the last day of March, when Dr. Rooms had called to take away his cards, he had been distinctly unfriendly and had refused absolutely to discuss any details of doubtful patients. Dr. Dixon had some days later visited him at his house, but had found him equally obdurate; Dr. Rooms had abused him and declared that he would bring him again before the council. Dr. Rooms repeatedly stated in that interview that the damage to his practice amounted to £3000. The partners had visited the clerk to the insurance committee, and had taken every step, through their collector and by posting up a notice in their surgery, to inform patients how they could return to Dr. Rooms's list if they desired.

The other respondents gave similar evidence, stressing the obstacles to record-keeping which overwork and illness had imposed.

After Mr. Pereira had cross-examined, the President indicated that the council were inclined to stop the case subject to counsel's right of address. Mr. Pereira replied that he would not attempt to influence the council to alter their present feeling. Accordingly, after short private deliberation, the President announced that the case was dismissed, the facts not having been proved against the respondents.

CHEMOTHERAPY OF TUBERCULOSIS.—Prof. Jörgen Lehmann asks us to state that when he wrote of *para*-aminosalicylic acid (*Lancet*, Jan. 5, p. 15) he was referring to 2-hydroxy-4-aminobenzoic acid.

Towards Social Security

A Borderland of Medicine

THE clinician may be excused a sigh when he finds pages of a medical journal occupied by discussion of difficulties in statute law and of obtuseness of Government departments. Details of cash benefits and niceties of medical certification seem far removed from the primary purpose of his work.

Yet the isolationist policy has little greater chance of survival in medicine than in world affairs. With its merits and demerits, the old independence of the State from any relationship with the individual (unless he commits a crime) is passing away. Increasingly, legislation becomes mandatory and not permissive: "every person who . . . is in Great Britain . . . shall . . . be insured" on the passage of the National Insurance Bill. Hitherto a large company of medical men and women have been able to indulge a distaste for insurance technicalities by leaving most of them exclusively to the insurance practitioners who attend to manual workers and those with limited incomes. In future every patient —and for that matter every doctor—will have a personal interest in the cash benefits, and it will no longer be fashionable to affect superiority by disdaining to claim them.

If legal formalities are found irksome, then keen brains in the profession should agitate to rationalise them. The techniques of administration should be adapted to fit smoothly into the lives of those whose skill is with the scalpel, the stethoscope, and the microscope. It is idle to say that an insured person is entitled to every medicament that is necessary, regardless of cost, if the busy practitioner is condemned to excessive form-filling and report-writing to justify his use of that medicament. The old tag about eternal vigilance being the price of liberty could be erected in illuminated letters at least once a year.

In the early days of insurance legislation, due weight to medical considerations was secured by the appointment as deputy chairman of the National Insurance Commission for England of Dr. Smith-Whittaker. When the commissions were abolished the administration in England was transferred to the Ministry of Health, which included a large department staffed by doctors. Coördination with the supervision of health of school-children was secured by appointing the same chief medical officer to the Ministry of Health and the Ministry of Education. What is the liaison with the new Ministry of National Insurance? The amalgamation of various departments responsible for cash benefits has obvious advantages. A case could be made out for the chief medical officer of the Ministry of Health to be appointed as chief medical officer of the Ministry of National Insurance in the same way as he serves the Ministry of Education.

The Self-employed

Under the new scheme, doctors themselves—unless retired from gainful occupation—will be insured for sickness benefit. The majority will no doubt be classified as self-employed. The full status of "employed persons" will be vouchsafed to those working under a contract of service, and this will be the position of those employed by public authorities or institutions. It will also apply to those who may enter into close relations with a public body concerned with general practice. The following observations therefore have an incidental personal interest for members of the profession. They treat of the doctor-patient relationship in a field where sometimes the patient is a doctor.

The biggest controversy raised on the second reading of the National Insurance Bill, apart perhaps from the friendly society interests, has been the problem of sickness insurance for the self-employed—i.e., the large group of people who are gainfully occupied on their own account—and it is remarkable to observe the change in the public mind.

The small shopkeeper, the village blacksmith, and the like, about whom so much has been said, were offered in 1912 the chance to come into the original National Health Insurance scheme as voluntary contributors. About 28,000 did so, but the whole tendency in borderline cases was to escape liability if possible, and it was only after the Contributory Pensions Act of 1925 that this tendency was reversed.

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A much larger number now insured on a voluntary basis came in because of at least two years' contributions as employed contributors, which gave them a claim to continue if they wished.

Sir William Beveridge in his report recommended that self-employed persons should be insured for all purposes except for unemployment benefit, and that in the case of sickness benefit they should not be covered for the first 13 weeks of incapacity. The Coalition Government white-paper, and the present Bill, adopted that recommendation, except that it substituted 4 for 13 weeks. The ostensible reason for refusing immediate benefit has been that a person in employment on his own account has some margin of resources to fall back upon in the early period of sickness. There is a deeper reason, however, which is only hinted at. The man who glories in being his own master has such freedom over his own time and the way he works (or directs other people to work) that it is hard to say whether on a particular day he is in fact working or not. Where a contributor is an employee the administrators of sickness benefit can readily ascertain whether he in fact attended at the place of employment and did any substantial work. For self-employed persons, however, the situation is entirely different. A small shopkeeper may, from his couch in the back parlour or even from his bed, give such directions for the conduct of his business that for some time his profits suffer very little from his illness.

It is at this point that the medical profession is particularly involved. The doctor's certificate of incapacity for work is not based on precise mathematical ascertainment but is a statement of opinion based on various relevant factors; it does not necessarily mean that the patient cannot do any work. The reluctance of the administrators to cover insurance from the beginning of sickness in the case of a self-employed person is a wise reluctance to place a greater strain on the certification system than it ought to bear. A concession of earlier sickness benefit for the self-employed will therefore raise problems for doctors.

In view of the dozens of appeals from all quarters of the House of Commons, the Parliamentary Secretary—somewhat surprisingly at that stage—indicated that the Government would consider an amendment to bring these persons into the scheme of sickness benefit on the same footing as other people if they were prepared to pay an extra contribution of 4½*d.* per week. There seems every likelihood that the general consensus of opinion will be that they can pay it and wish to do so.

After that, the trouble begins. An employed person always has an inducement to go back to his place of employment, lest eventually he should lose his work. Even if his job has been allocated to somebody else, he will, under the new scheme, have a chance of transferring from sickness benefit to unemployment benefit at the same rates. The self-employed person, however, is not insured against unemployment. He often has opportunities during illness for exercising some degree of control over his business or its goodwill, and it is going to be hard to say to him that while he is in receipt of sickness benefit he must not raise a finger to make a penny on his own account, but that after the day of "declaring off" he can use his energies as much as he likes. Often a certain amount of general activity for body and mind is an aid to the restoration of working capacity, and there is an important field for inquiry here as to the attitude which the administration ought to adopt.

Before leaving this topic I must say a word about a popular delusion. It is often thought that the self-employed are paying an unfairly high contribution. The facts are that all contributions are precisely regulated according to the benefits of the contributor concerned, and everybody, within a halfpenny, is paying the right amount. The present proposed contribution for a self-employed man of 5*s.* 9*d.* per week should not be compared with the 4*s.* 7*d.* paid by the employed person himself but with the 8*s.* 5*d.* which comprises the contribution of the employed person plus the 3*s.* 10*d.* paid by his employer. This payment by the employer is not made for his own personal benefit, or even that of the business, but solely and exclusively for the benefit of the employee.

The difference between 5*s.* 9*d.* and 8*s.* 5*d.* is accounted for by the absence of unemployment benefit and also by the absence of sickness benefit for the first 24 days. If sickness benefit is to be paid for those days, as is now suggested, the self-employed person will be contributing 6*s.* 1½*d.* per week as against 8*s.* 5*d.* Of this about 3*s.* 11*d.* represents the contribution for retirement pensions, which are provided equally for all classes of contributors.

Change in Rules of N.H.I. Certification

After an insured person has been ill for a month the practitioner has been able to issue a "special intermediate certificate" (coloured pink) at intervals up to 4 weeks if treatment is not required oftener. Amending regulations now permit intervals up to 8 weeks where there has been 6 months' incapacity. Another change is greater flexibility by permitting the certificates any time within the "insurance week" (which runs from Monday to Sunday). This corresponds with the practice for ordinary weekly intermediate certificates after the first intermediate certificate.

The arrangements are still limited to cases where it is unnecessary to see the patient for the purpose of treatment. There are some, however, who think that where there can be no doubt about incapacity the special intermediate certificate should be permitted even though some treatment may be required. Indeed some lay administrators believe that the pink certificates are used in such cases and say they would not think of challenging the practice.

A small point over the publication of the regulations may want watching. They were made by the Minister of Health on Feb. 1 and promptly published. They thus came into effect. But it was not until Saturday, Feb. 9, that approved societies generally were notified of the change. Probably no difficulty has arisen on this occasion; but where future concessions are made it will be necessary to make sure that the lay administrators are made aware of them at least as soon as the doctors take advantage of them.

JUSTINIAN.

On Active Service

CASUALTIES

DIED AS P.O.W.

Lieut.-Colonel CYRIL ARMSTRONG, M.B.E., M.B. Durh., R.A.M.C.

MISSING PRESUMED KILLED

Surgeon Lieutenant GEOFFREY SUFFLING CROSS, M.R.C.S., R.N.V.R.

AWARDS

M.B.E.

Major L. W. LAUSTE, M.D. Lond., F.R.C.S., R.A.M.C.

Major Lauste was a surgical specialist serving in France in 1940. When the unit to which he was attached was evacuated to the United Kingdom, he remained behind and was captured by the Germans at Boulogne. He was senior British medical officer at Statroda Hospital until 1943, when he was transferred to Stalag 344, and later to Stalag VIIA Moosburg. During his captivity Major Lauste, by his outstanding devotion in the care and treatment of the wounded, his resolute bearing in his dealings with the German authorities, and his high morale, set an inspiring example. His good advice, always quietly given, and professional skill had an undoubted influence on the less experienced officers and medical orderlies, and his tireless work has earned the highest praise.

Major Lauste, who is hon. surgeon to the Sussex Maternity Hospital, Brighton, was called up when war broke out.

MENTIONED IN DESPATCHES

Surgeon Lieut.-Commander H. G. SINGER, M.R.C.S., R.N.
For good services while prisoner-of-war.

MEMOIR

Lieut.-Colonel CYRIL ARMSTRONG was born in 1893 and graduated M.B. at the University of Durham in 1914. He joined the R.A.M.C. at once and served in France till the end of 1915, and in 1920 he was appointed to a regular commission in the corps. He was physician and surgeon at the Royal Hospital, Chelsea, from 1935 till he was posted to China in 1939 to take charge of the British military hospital at Shanghai, and later he commanded the combined military hospital at Kowloon which was moved to the Island of Hong-Kong before the invasion. But its new site was overrun when the Japanese landed on Dec. 18, 1941, and Colonel Armstrong was held as a hostage. After the surrender he was able to start a new Indian hospital in St. Albert's Convent, but soon this too was closed and he was sent to a prisoner-of-war camp at Kowloon, where he did good work under trying conditions until his health broke down. Quiet and studious, he yet had a North Country pawkishness that flashed out unexpectedly. He leaves his wife with a daughter and a son now serving in the Rifle Brigade.

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In England Now

A Running Commentary by Peripatetic Correspondents

WHAT stories could not those phials of old tuberculin Hoechst tell of hopes and fears, of good repute and ill—one c.cm. of glycerin broth from Ruppel's big flat-bottomed flasks with tubercle bacilli growing like mould on the surface. Ruppel told me it was all sired from one spit and had gone on unchanged from generation to generation for 21 years, always lethal to the cony on the n+1th day, a pathogen of set purpose. The *Times* the other day recalled Camac Wilkinson's championship of tuberculin as the infallible cure of consumption; and little enough other encouragement was there for those depressed, half-starved poitrinaires in the Kennington Road clinic. His methods and manners inspired confidence: "Look at me measuring the stuff in this capillary tube," he once said to me; "I never make a mistake." And he had many followers whose goal was to inject the whole content of one of those phials at a sitting without inducing reaction. What it produced except tolerance to itself has never finally been cleared up. W. R. Huggard of Davos when asked what he thought of giving such a colossal dose replied, with that engaging stutter of his, "it might have some small n-nutritive value."

* * *

The art of lying in bed, as Lin Yutang remarks, has been neglected in the Western world. In this note I am confining myself to lying in bed alone, at times a necessity. The first essential is to get out of one's head the modern and materialistic idea that the object of lying in bed is to sleep. The object of lying in bed is to enjoy oneself, and it is no more than a fortunate accident that good sleeping and waking happen to contribute so much to the main object. Similarly one's object in designing the bed and bedroom must be not, as seems usual in England, to provide a place where, other things being exceptionally favourable, one may be able to sleep, but a place where one can enjoy oneself to the full. The comfort of the bed goes without saying, as does the arrangement to taste of such matters as warmth and ventilation. Do not be led astray by the again very English idea that it is necessary to salvation to admit the more inclement states of weather to the bed-chamber. Our forefathers slept with closed windows without hurt, and so can you, if you feel like it. A bedside table lamp and ash-tray are, of course, essential, and some may like a spittoon, though I do not find this necessary myself. The bedside carpet is important and must be gratifying to the bare feet. Of Persians, Kirmans and Kashans lack the necessary thickness of pile. A subdued Shiraz will fulfil most people's requirements, though leptoforms may require something with a more stimulating pattern, say a Tabriz. The choice of bedside literature is, of course, a personal matter. I like the Book of Ecclesiastes, Omar Khayyam, and a few of the more lugubrious poems of A. E. Housman. Some need pictures, and must consult their own tastes. In general I would say that the moderns are out of place. Mezzotints of the larger carnivora, some in repose and some at play, can be relied on to give the right atmosphere, while biblical oleographs, particularly those depicting Daniel among the lions, should be rigidly excluded.

The next question is how to achieve the necessary state of relaxation. This is partly mental, the moral being that one must not let the sun go down on one's grievances, and partly a question of position. Some relax best on their backs, some curled on their sides, some in moderate opisthotonus diagonally across the bed, and some on their stomachs. Now these positions in bed, as all psychiatrists know, are related to character types, and most criminals lie on their stomachs. I too relax best on my stomach, but like to think that this is merely a function of my centre of gravity. The position of the hands and arms must not be neglected, and I recommend to those who have not tried it a loose embrace of the pillow, which may also be bitten or chewed from time to time if this is found helpful. In cold climates care must be taken with the set of the bedclothes against the body, and with the tight sealing of any space between the neck and the shoulders, unless, of course, you belong to the head-under-the-bedclothes school, for which there is much to be said. The bottoms of pyjamas without the tops are usually worn in the East, and the tops without the bottoms for some reason in America. In the climate of England it is generally best to wear both.

Lastly, I must deal briefly with the stretch. As a corollary to relaxation, the stretch, if allowed to take its full and uninterrupted course, provides one of the richest sensations that man enjoys. Unfortunately the true stretch cannot strictly be cultivated, for its onset is involuntary. Thereafter there is some art in prolonging it to the full and in exploiting all possible variations. It can be performed sideways, backwards and forwards, and in any series, and most, though not quite all, combinations of these movements; and this with the addition of appropriate free movements of the arms and legs, and if so desired of the jaw and respiratory apparatus, can provide an almost infinite variety of exquisite sensations. Incidentally the toe-nails should be kept short, or damage to sheets may result. Further experiment is needed into the possible variations of the stretch, and this might well be encouraged by a grant from the M.R.C. Over-enthusiastic workers may need an expert manipulator to unwind them, and this must, of course, be allowed for in the scheme.

In conclusion, I throw it out as a hint to budding diagnosticians—probably as a pearl before swine—that no-one who can achieve a really satisfactory stretch is likely to be suffering from serious neurosis, for the latter involves degrees of inhibition of free movement that make this impossible. My next instalment, on lying in bed in company, will no doubt be equally helpful and informative.

* * *

When doing a locum I attended a family of actors. The wife had a small infection of the finger which put the whole place into a ferment (I nearly said a fermentation). In a few days' time it was healing but to my surprise they rang up urgently in the late evening asking me to come at once as the finger was gangrenous. I felt bored and irritated but got out the car and drove many miles to the house. As I entered the sick-room I had an impression that Hamlet, Macbeth, and Lear were all being played at the same time. The unfortunate woman lay on a divan moaning and letting out distressing cries. The anguished husband was distraught. He threw up both hands to heaven, dropped them beside him as though no more misery were possible, ran them distractedly through his hair, and looked at me with an expression of unutterable woe. The other members of the family stood mutely resigned in a corner, but gave me a baleful look as I entered. Inspection of the gangrenous finger revealed a tiny hæmatoma about the size of a match-head. I solemnly assured them that the worst had not yet happened and that the finger, and life itself, would certainly be saved. They expressed relief and gratitude but the general despair seemed only slightly abated. I left supposing that they had not believed a mere locum and were intending to call in someone else. It was some time before I learnt from my employer that the real cause of the trouble was not the finger at all but news that they had lost £5000 in a theatrical venture.

* * *

These skin chaps really are wonderful. Dermatology and horticulture are now almost indistinguishable. Recently I had occasion to write to a colleague, a surgeon of some repute and also a keen rock-gardener. I asked him: Have you any *Hyperkeratosis variegata* in flower yet? He replied: No, when should it flower? Where does it grow best? And from whom can I get a specimen? Recent gems from my own cold alpine house include a dainty little cushion plant *Keratoderma punctata*, the creeping *Pityriasis varioliformis* (var. *lichenoides*), and the rather unsightly straggling *Necrobiosis lipoidica* with its musk-like scent.

And I see the dermatologist has borrowed another idea from the botanist, for he now puts the authority in parentheses after the genus and species. Any flower-lover knows *Sedum anglicum* (Huds.) or *Cardamine pratensis* (Linn.) and now we have, I observe, Angioma serpiginosum (Crocker). Soon, as familiarity breeds—well, let that pass—soon, we may expect Alopecia multiforme (Rox.), Dermatomyositis pigmentosa (Barb.), or even Epidermomycosis bullosa cystica vel hæmorrhagica (P. W.). But why not English? "Toe-rot" may give an exaggerated idea of the pathology, but it leaves the classics at the post for brevity, clarity, and in my view euphony.

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Public Health

MILK-PRODUCTION: THE OTHER VOICE

FROM A VETERINARY CORRESPONDENT

A leading article[1] last year remarked that there were two voices in milk policy and that the self-interest of the producer might not fit exactly the needs of the consumer. Even the severest critic of our milk-supply, however, will admit that there has been a vast improvement since 1771, when Smollett described milk in these terms:

"The produce of faded cabbage-leaves and sour draff, lowered with hot water, frothed with bruised snails; carried through the streets in open pails, exposed to foul rinsings discharged from doors and windows, spittle, snot, and tobacco quids, from foot-passengers; overflowings from mud carts, spatterings from coach-wheels, dirt and trash chucked into it by roguish boys for the joke's sake; the spewings of infants, who have slabbered in the tin-measure, which is thrown back in that condition among the milk, for the benefit of the next customer; and, finally, the vermin that drops from the rags of the nasty drab that vends this precious mixture, under the respectable denomination of milkmaid."

It would perhaps be surprising if a seller and buyer ever did agree exactly; but it should be realised that if the conditions of milk-production are made too onerous, and the financial reward is insufficient, an adequate supply of milk will not be produced.

PASTEURISATION NOT ENOUGH

Apart from price, the chief controversy during recent years has centred around pasteurisation. There are people—even doctors—who still oppose it, and the argument will doubtless smoulder for many years; but the principle that contaminated milk can (and must) be made safe by pasteurisation is generally accepted. Veterinarians have constantly advocated the heat treatment of milk. Fleming, in his *Veterinary Sanitary Science and Police*, written in 1875, was one of the first in Great Britain to draw attention to the danger from tuberculous meat and milk, particularly for children, and the desirability of heat treatment. The same attitude was adopted by McFadyean at the British Congress on Tuberculosis in 1901 when he opposed Koch's statement that there was little danger to man from bovine infection: and some time ago the National Veterinary Medical Association passed a resolution supporting pasteurisation. The National Farmers Union also supported the recent white-paper on Milk Policy, which envisages a large increase in the amount of pasteurised milk; so there now seems to be little organised opposition to the pasteurisation of milk for human consumption. No-one has ever contended that "a few bovine tubercle bacilli" would be advantageous to calves, pigs, or other animals, and it is interesting that compulsory pasteurisation was first introduced in Denmark in 1899[2] not to protect man but to prevent the infection of calves and pigs with separated milk returned from the creameries. Apart from the safety factor, it should be realised that because of the time occupied in transport from the farm to the town a great deal of unpasteurised milk would be sour before it could be used. That is the real reason why the large dairy combines have introduced pasteurisation.

While therefore the value of pasteurisation is generally accepted, its beneficial effects should not be overestimated. In a lecture lately given to the Food Education Society, Lord Portsmouth quoted Lord Listowel's statement in the House of Lords on April 11, 1945, that in 24 years, from 1913 to 1937, 14,000 people had been involved in milk-borne epidemics and concluded that the annual danger of being involved in a milk-borne epidemic is 80 times less than being involved in a motor accident. Moreover, though pasteurisation if properly carried out practically eliminates the danger of milk-borne disease, including human tuberculosis of bovine origin, it has no effect on the far more prevalent disease caused by the human tubercle bacillus.

Pasteurisation is only a small part of the whole process of milk-production and distribution; what else is necessary to provide a sound milk-supply at a reasonable cost? Leaving aside the question of efficient distribution, it is obvious that efficient production depends on a good water-supply and good buildings, and even more on an efficient and contented farming community and healthy livestock. For several years the provision of good water-supply, good buildings and dairy equipment, including pasteurisation plant, will compete directly with other urgent needs of the community.

Much is being done by farmers' organisations and Government schemes to increase the technical knowledge of farmers and the efficiency of their methods. But farmers have a wider field to cover than those engaged in almost any other occupation. They have to understand the intricacies of farm machinery—the tractor, the self-binder, the combine harvester, and the milking machine with its small petrol motor which will not start on a cold morning, to mention only a few. They must know about soil, artificial manures, and cropping, and also about livestock husbandry, breeding, and disease control. Yet many townsmen still misconceive of the "farmer" as a bewhiskered yokel in knickerbockers and gaiters who talks like a wireless comedian. It is worth noting that during the past few years delegations from America have had far less criticism and more praise for our methods of farming than for our methods of coal-mining or of manufacturing cotton goods. With their depleted staffs during the war British farmers produced 70% of our food.

Nevertheless when the subjects of livestock husbandry, breeding, and disease control were debated last year in the House of Lords,[3] Lord Bledisloe quoted figures which apparently showed that the average milk yield in various European countries was related to the relative number of veterinary surgeons in those countries. And France is the only country with a lower average milk yield and a smaller number of veterinary surgeons than Great Britain.

SIX PROPOSALS

Lord Bledisloe's figures suggested that the losses due to the major disease of dairy cattle cost the country £20–30 million a year, and he made a number of proposals for improving the quantity and quality of the milk-supply. First, a proper survey of the incidence of animal disease should be made; it is obvious that the most effective way to do this is to have an efficient system of meat inspection under veterinary control. Secondly, we need an increased bonus for milk from attested (tubercle-free) herds; already 10% of dairy herds are attested and produce 15% of our milk. Thirdly, there should be a "free State veterinary service" and a compulsory instead of a voluntary health service. Fourthly, he held that cows which have reacted to the tuberculin test should be marked (this suggestion was carefully considered by the Economic Advisory Committee on Cattle Diseases, who concluded that it would penalise the progressive farmer, and do little real good with the present incidence of tuberculosis). Fifthly, all calves should be inoculated against contagious abortion. Sixthly, disease-free areas should be established and gradually extended—the only method by which enzoötic disease has been repeatedly eradicated. Seventhly, a State abattoir service should be set up under veterinary supervision, as in most other progressive countries—a measure which would automatically provide most of the information about the incidence of disease which

1. *Lancet*, 1945, i, 502.
2. Bang (1899) reprinted in "Selected Works," 1936. Oxford University Press, p. 377.
3. *Vet. Rec.* 1945, **57**, 185.

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Lord Bledisloe so rightly desires. He also advocated a large increase in the facilities at our veterinary colleges, and in this received the support of other speakers.

Lord Listowel's statement (subsequently amended) that our dairy herds are "riddled with disease" caused some consternation, and there were people who concluded that the veterinary profession must be very incompetent. The statement falls into proper perspective, however, when one realises that although 40% of our dairy cattle may react to tuberculin (and this estimate is based on very incomplete evidence) at least 60–80% of the human population will react similarly—they too are riddled with disease. This last figure is not usually held to prove that the medical profession is particularly incompetent.

RESISTANCE TO INFECTION

Lord Bledisloe's suggestions for the control of animal disease would be supported by nearly all veterinary workers in this country. Lord Portsmouth, on the other hand, places the main emphasis on sound breeding, nutrition, and hygiene. Though it is doubtful whether any attempt to breed cows with high genetic resistance to even one disease is practicable, all will agree that nutrition and hygiene play a decisive part in the ætiology of many diseases in calves, lambs, foals, and piglets in which digestive disturbances and bad conditions allow a number of ubiquitous bacteria and viruses of low pathogenicity to produce serious disease. It is a very different matter, however, when one considers the great animal plagues, such as pleuropneumonia and rinderpest; it has been shown over and over again that the only way to eliminate these is to destroy the invading virus. The same is true of foot-and-mouth disease, tuberculosis, and contagious abortion. Foot-and-mouth, like some human virus diseases, attacks healthy well-nourished animals more readily and more severely than animals in poor condition, which rebuts Lord Portsmouth's argument. Though tuberculosis is less common in animals kept in the open than those that are housed, this is not because animals in the open are more "healthy" but because their exposure to infection is far less. As Sir John McFadyean wrote [4]:

"The veterinary surgeon who, when he is consulted as to the means by which tuberculosis may be eradicated from a herd, tells the owner that he must seek protection by building up the constitution of his animals, and by adopting methods of breeding that will ensure to them sound bodies and perfect mucous membranes, is offering 'empty chaff well meant for grain.' The man whose sense of proportion is not hopelessly defective will attach only minor importance to such considerations, and will concentrate his efforts against the one great cause of the disease—the operation of contagion. When that has been successfully grappled with predisposition becomes of no account, and as long as it is neglected the endeavour to stay the progress of the disease by any other method is as hopeless as the search for the philosopher's stone."

Sound breeding and nutrition are essential to efficient farming; good hygiene will prevent some diseases and reduce the incidence of all to a variable extent; but the overriding importance of specific infective agents in the causation of many animal and human diseases cannot be overlooked by anyone familiar with the great advances in preventive medicine during the early part of the twentieth century.

Smallpox

THE two cases of smallpox at Grays, Essex, reported last week (p. 288), in a R.A.M.C. sick-berth attendant home from the East and his young nephew, have given rise to two more. A sanitary inspector who attended to the bedding of the R.A.M.C. orderly has developed a severe prodromal rash; he had not been vaccinated since childhood. A second nephew of the orderly has mild prodromal symptoms; he had been vaccinated after his brother developed the disease.

No further cases have been reported from Hampstead so far. The R.A.M.C. officer who came home from India by air and infected his family with smallpox writes in this issue urging that families of Service men expected back from the East should be vaccinated well before their arrival. This should certainly be done where a returning Service man is known to have been in contact with smallpox cases abroad or on board ship, and particularly where air transport is being used, since this removes the safeguard of the long journey home by sea.

The ship which had two cases of smallpox on board when she arrived in the Mersey from Bombay on Feb. 18 was the *Empress of Australia*, and not the *Empress of India* as stated last week.

Typhoid Fever in Walthamstow

Towards the end of January a young scholar from a school at Walthamstow in Essex was admitted to Hermon Hill Hospital for treatment and observation. In a few days he was found to be suffering from typhoid fever and was transferred to an infectious diseases hospital. Despite the usual precautions one of the nurses at Hermon Hill Hospital contracted the disease and another remains under observation. Soon after the discovery of the first case two others were discovered in Walthamstow children, one at a hospital and one at home. Full inquiries have been made, in collaboration with a medical officer from the Ministry of Health, and it is hoped that no secondary cases will arise from those already reported.

AN INTERNATIONAL HEALTH CONFERENCE

DURING the London meeting of UNO the proposal for an international health conference was first raised at the 5th meeting of the Economic and Social Council on Feb. 7. At the San Francisco conference the delegations of Brazil and China had jointly proposed the calling of such a conference, and at the 5th meeting of the Economic and Social Council Dr. Chang (China) presented a document framed on the lines of the San Francisco proposal. Discussion continued at the 6th, 8th, and 10th meetings of the Economic and Social Council, and at the last a resolution was presented by which the council:

(1) Decides to call an international conference to consider the scope of, and the appropriate machinery for, international action in the field of public health and proposals for the establishment of a single international health organisation of the United Nations.

(2) Urges the members of the United Nations to send as representatives to this conference experts in public health.

(3) Establishes a technical preparatory committee to prepare a draft annotated agenda and proposals for the consideration of the conference, and appoints the following experts or their alternates to constitute the committee:

Technical subcommittee appointed at meeting of Feb. 15: Dr. René Sand (Belgium), Dr. G. H. de Paula Sousa (Brazil), Dr. P. Z. King (China), Brigadier-General Chisholm (Canada), Dr. Aly Tewfik Shousha Pasha (Egypt), Dr. Cavillon (France), Dr. M. M. Baez (Mexico), Dr. Karl Evang (Norway), Sir Wilson Jameson (United Kingdom), Surgeon-General Thomas Parran (United States), Dr. Andrija Stampar (Yugoslavia), Major C. Main (India), Dr. Kopanaris (Greece), Dr. Josef Cancik (Czechoslovakia), Dr. Martin Kapczak (Poland), and Dr. Gregorio Bermann (Argentine); and, in a consultative capacity, representatives of the Pan-American Sanitary Union, the Office Internationale d'Hygiène Publique, and UNRRA.

(4) Directs the technical preparatory committee to meet in London not later than March 15, 1946, and to submit its report, including the draft annotated agenda and proposals to the members of the United Nations and to the council not later than May 1, 1946.

(5) Decides that any observations it may make at its second session on the report of the technical preparatory committee will be communicated to the proposed international conference.

(6) Instructs the secretary-general to call the conference not later than June 20, 1946, and, in consultation with the president of the council, to select the place of meeting.

4. *J. comp. Path.* 1901, **14**, 285.

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Parliament

ON THE FLOOR OF THE HOUSE

IT is no secret that our relations with the Soviet Union have during the last few months deteriorated from good to indifferent. The Russians suspect us, as Mr. Philips Price told us on the evidence of his very recent two months' stay there; while we suspect the Russians, as any daily paper will inform you. Indeed it is said by eminently responsible people that the Anglo-Soviet Alliance is temporarily in abeyance. Against this background of misgiving the debate on foreign affairs kept to a sober note. Mr. Bevin felt constrained to say that he could not conceive of any circumstances in which Britain and Russia could go to war. Nevertheless, war between Russia and Britain has happened in the past, and it may have been previously regarded by a British Foreign Secretary as inconceivable. What the House feels is that the Anglo-Russian alliance must be strengthened, and Sir Stafford Cripps's offer of a trade agreement is a common-sense economic step in this direction.

The aftermath of war, the effects of fatigue, and chronic deprivations of one kind or another all add up to produce a condition of mankind in which our resistance is lowered to the infection of suspicion if not to a definite physical infection.

The news from India and the news from Egypt do not make happy reading, and the journey of Lord Pethick-Lawrence, Sir Stafford Cripps, and Mr. A. V. Alexander to India to arrange with Indian leaders for the future independence of India will be a grimly responsible business without much gilt on any festival gingerbread.

It may well be that the British public, when they kicked up a row with Sir Ben Smith about dried eggs, were right not only physiologically but psychologically also. And Lord Woolton, who raised the question of food-supplies in the House of Lords, put his finger on the failure to supply 8 oz. of fat per week as a major deficiency which needed immediate remedy. He wanted to know whether we were going to import maize from the Argentine to feed our livestock, which the raising of the rate of wheat extraction for human food will deprive of their expected cereal ration. In South America they were last year burning maize to heat the boilers of their locomotives, because they couldn't get the oil to run them from sources under U.S.A. control.

One thing Lord Woolton said to arrest attention. He asked the Government not to be too internationally minded, but to think of Britain first. And while it cannot be conceded, in these days of UNO, that we can be too internationally minded, it is true that we must look after our own family first. Members are more and more being compelled to recognise—by personal contacts with their constituents, through correspondence, and by interviews—that there is a lot of soreness about food, housing, and living conditions. Up to the present we have had no differential scale of rations (such as existed in France and other countries during the war) except in respect of invalids, children, and nursing mothers. Consideration may, however, now be given to the possibility of differential rations for miners, to whom canteens are of little use, and to other heavy workers.

When, a year ago, I interviewed Mr. Van Acker, prime minister of Belgium, the food to which he attached most importance was fat, and some of the great and rapid recovery which has taken place in Belgium may be due to this food wisdom. Now the miners in Great Britain are asking for more fat, as well as more meat. Whatever food is required for good production by the heavy workers the Government ought to do its utmost to provide.

MEDICUS, M.P.

FROM THE PRESS GALLERY

Patients' Rights

When the Industrial Injuries Insurance Bill was considered on report on Feb. 18, the medical interest of the discussion was centred on clause 25 which defines the obligations of claimant and beneficiaries. Mr. F. C. R. DOUGLAS moved to delete a provision that the regulations might prescribe the treatment appropriate to the injury suffered by a claimant. The clause gave the Minister power to oblige the injured person to observe the treatment which the Minister's doctor had prescribed, and to deprive him of benefit if he did not follow it. The Minister also had power to make regulations which would impose upon the unfortunate claimant a liability to pay £10 for every day during which he refused such treatment. The definition covered all kinds of treatment, including amputations and inoculation. He was not aware of any case in which the legislature had imposed obligations of this kind on any citizen. Even disciplined members of the Armed Services had the option of refusing certain kinds of treatment.

Mr. G. HOUSE, in seconding the amendment, said he had no objection to an injured workman being examined from time to time by a registered medical practitioner, but he strongly objected to the imposition of treatment of which the injured man did not approve. Mr. House further urged that the injured workman should be free to choose between the medical practitioner and the unorthodox practitioner. Mr. House, who said that his own experience of natural healing extended over 13 years, asserted that the supporters of the amendment were not asking for anything unreasonable or submitting a case for quacks. He had been closely associated with unregistered practitioners and he knew they were prepared to deal effectively, and in an organised manner, with quacks. He only wanted to see such unorthodox medical practitioners recognised as could comply with whatever standard of qualifications the Minister might prescribe.

Mr. R. T. PAGET recognised the need to provide power to stop compensation when a man would not take the advice that would enable him to be cured, but in his practice in the Courts, in cases arising under the Workmen's Compensation Act, he had come across many cases where a man, owing to the stoppage of compensation, had submitted to an operation and often the results were unsatisfactory, possibly because little medical treatment was much good unless it had the confidence and coöperation of the patient. Sir FRANK SOSKICE, Solicitor General, said that the Minister never intended that failure to comply on the part of a workman should be a criminal offence. The Bill itself, he held, was satisfactory as drawn, in that all it provided was that if a workman unreasonably refused to carry out a doctor's advice he forfeited his right to benefit. It all depended, Sir Frank suggested, upon the regulations made under the Act, and under clause 66 an industrial injuries advisory council was to be set up, to whom the regulations would have to be submitted. Moreover, when the council had passed the regulations, they must still be submitted to Parliament.

Dr. H. B. MORGAN thought that a great deal of the anti-medical prejudice which existed was the aftermath of conditions under which workmen had been examined by a particular set of doctors with a particular mind. Their object had always been to try to see whether the man was malingering or whether he was trying to prove that his injury or disease was due to an accident, whereas the Ministry of Pensions tried to pretend that it was not. Medical education needed revision from top to bottom. Assessment of disability resulting from diseases or accident had not been taught up to the present time in our best medical schools. But even if the medical profession in the past had made mistakes, and even if it was true that some nature cures in exceptional cases had produced results the fact remained that the workman was entitled to the best trained medical treatment he could get. No untrained treatment was sufficient, and the Government ought to see that the workman did receive the best possible medical advice. Dr. Morgan failed to see why any scheme to which all workers contributed should not lay down rules and regulations for the appropriate treatment of every individual on a broad scale. He hoped that the Minister would see that he got the right type of doctor to give the workman a square deal.

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Mr. JAMES GRIFFITHS denied that the Ministry or its officials had any interest in refusing a man compensation or payment under this Bill. They had a real interest to see that the injured man got fair treatment and fair play. He reminded the House that the Bill to provide a complete national-health service would bring to the whole community, including the injured, all that was best in medical science and knowledge. Sir FRANK SOSKICE further contended that the injured workman was in a more favourable position under this Bill than under the Workmen's Compensation Acts, when there was a dispute between doctors. Under the former, if it was shown that the workman's doctor was wrong, the workman lost his compensation. Under this Bill, if the workman could show, not that the Ministry's doctor was wrong, but that he had any other reasonable ground for not complying with what the Ministry's doctor recommended that was sufficient to enable him to retain his compensation. But Sir HENRY MORRIS-JONES held that an appeal as at present to a judge in a court of law with medical assessors was infinitely better than the proposal under this Bill of appeal first to a lay insurance officer and then to a local appeal tribunal or the commissioner.

Dr. S. TAYLOR hoped that the Government would resist the present amendment, because it made nonsense of the whole clause. All the amendment did was to suggest that the doctor should not be permitted to carry out examination for treatment, but it still permitted treatment in the next subsection.

The amendment was negatived, and Mr. DOUGLAS moved a further amendment to leave out from the clause words giving power to deprive a man of his benefit because he did not follow rules laid down for his individual case by a doctor appointed and paid by the Minister, which was accepted.

Later the Government also accepted an amendment to clause 66, which deals with offences and penalties, providing that it should be an offence not to comply with a regulation, other than a regulation requiring a workman to submit to medical treatment.

Other amendments carried were :

In the original provision of payment for the first 3 waiting days when incapacity lasted not less than 24 days, the period of 12 days which need not be continuous was substituted for 24 days. The Government are adopting the same line in the National Insurance Bill. The cost of the concession is estimated at an additional £300,000 per annum.

Provision was made for a new age-group of 17- and 18-year-olds with a new injury benefit of 33*s*. 9*d*.

The constant attendance allowance in exceptional cases of severe disablement requiring considerable nursing may be raised to 40*s*.

QUESTION TIME

Colonial Medical Service

Mr. D. L. LIPSON asked the Secretary of State for the Colonies what steps were being taken to recruit and train doctors for the Colonial Medical Service in West Africa and to maintain it at its present level.—Mr. G. HALL replied : The number of applications received from qualified men for appointment to the Colonial Medical Service is now nearly equal to the total number of vacancies, and applications are continuing to come in at a steady rate. I am, however, concerned at the disinclination of many candidates to serve in West Africa and I have under consideration proposals designed to make the service more attractive, particularly to candidates with higher qualifications. For training, the fullest use is made of the courses in tropical medicine at the Universities of London, Edinburgh, and Liverpool.

Certificates for Hot-water Bottles

Dr. S. TAYLOR asked the President of the Board of Trade if he was aware that retail chemists in the London area were still demanding medical certificates before supplying rubber hot-water bottles ; and whether he would take steps to bring to their notice that they no longer had any authority to do so, and thus avoid waste of time by both the public and the doctors.—Sir STAFFORD CRIPPS replied : The answer to the first part of the question is yes. Retailers have no authority to demand medical certificates before supplying hot-water bottles. But if a rubber hot-water bottle is, in the opinion of the patient's doctor, necessary for the purposes of treatment, it is desirable that a medical certificate should be given some priority. Certificates should be issued only on that ground.

Letters to the Editor

SAFETY IN THE HOME

SIR,—In THE LANCET of Feb. 3, 1945 (p. 155), Dr. Marion Wright told a plain story of 50 people who had been burned and stated that 45 of those 50 injuries, 5 of them fatal, resulted from "avoidable accidents"—they should not have happened. Your annotation on home accidents in the same issue (p. 152) was indeed timely : "ignorance and gross carelessness" you instanced as contributory causes ; "bad housing, overcrowding, and lack of safety precautions are equally serious factors; it needs no statistical analysis to tell us what should be done."

A year has passed and we have just surveyed the statistics of the burning accidents treated at this hospital in the past twelve months. The number of patients so severely burnt as to require inpatient treatment numbered 205 ; of this total, 78 were children under five years of age. The latter is a sad figure and illustrates the present high proportion of these distressing injuries in the very young. Inquiring into the social background of these domestic accidents our experience substantiates all Dr. Wright's conclusions.

We feel however that a long-term policy is required to improve the education and to lessen the gross carelessness, the bad housing, and the overcrowding of the less fortunate members of society. Since to this background are added other dangerous factors, some immediate measures are required to prevent these crippling and sometimes fatal injuries. For example, in analysing our burning accidents, the most severe burns in children (3 so severe as to offer no hope of recovery) were caused by nightgowns made of inflammable material coming into contact with unguarded fires. The law (Children's Act 1908) requiring the provision of fire-guards is ignored. Further, these safety devices are still largely unobtainable; yet this is a matter that could receive immediate attention.

Perhaps, too, the Board of Trade could help manufacturers to abolish the use of inflammable materials for clothes, especially children's clothes. At present the most popular nightgowns for children are made of "winceyette" or "flannelette," which are inflammable cotton fabrics ; even more dangerous is the fact that when made up into nightgowns these materials tend to stand out and swing out and are therefore more liable to come into contact with an open fire without the wearer immediately appreciating the fact. Once alight, with the free air currents around, they burst into flame. During the war these cheap materials have replaced the equally inexpensive "interlock" nightgowns. Interlock is a knitted cotton fabric less inflammable than winceyette or flannelette, and, more important still, interlock clings to the body and therefore is less likely to come into contact with open fires without the wearer's knowledge. Inexpensive and safe children's nightwear would be of interlock design made of non-inflammable fabric.

These then are two preventive measures that could immediately be undertaken. The final remedy is through education and better living conditions.

Birmingham Accident Hospital. WILLIAM GISSANE.

FUTURE OF DENTISTRY

SIR,—In thinking about dentistry and its future may not the patient's point of view be considered ?

What does the patient, or potential patient, want? First, the majority want to avoid dental treatment. When they are driven to the dentist they usually seek relief from pain and most of them want "to have it out painlessly"—they don't "hold with fillings," and if they need artificial substitutes they prefer a "complete set," thinking that then their dental troubles will be over. Broadly speaking most citizens of this country still do not respect their teeth. They require educating, and it will probably take generations to change their mental attitude to dentistry. There are signs that this change is taking place slowly—no-one who has practised dentistry for thirty years (with his eyes open) can deny this—and the dental profession itself has done and is doing most of the work in this educative process. There are already many patients who do respect their teeth, and it should

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be impressed on all would-be reformers that the two classes of patients—i.e., the regulars and the sporadics—make two very different types of dental practice. The former in the main demand conservation, the latter "blood and vulcanite."

Both classes make certain demands on their dentist. He is expected to be an efficient craftsman, and the patient approves of him if (*a*) he works "painlessly," (*b*) his fillings stay in, and don't hurt the tooth, and (*c*) his dentures work and "look nice." So much, for the moment, of dentistry as a craft.

The recognition of the fact that oral sepsis is a considerable factor in the production of systemic disease brings a complication into the dentist-patient relationship. This complication has become important only in the last two generations. It has brought general medicine into much closer contact with dentistry, and, since most medical men know nothing about the mouth, and some dentists know very little about anything except teeth, it has introduced a good deal of confusion into the patient-dentist-doctor triangle. The answer is again more education—at each side of the triangle.

It should be remembered that the Royal College of Surgeons of England instituted the licence in dental surgery—the first dental diploma in this country—as recently as 1860. Before that date dentistry was practised only by medical men and by craftsmen without any academic qualification. Small wonder, then, that in those days hospitals appointed medical men practising dentistry to their staffs; and this is the historical reason behind the fact that some hospitals, by their constitutions, must still appoint medically qualified dental surgeons to their staffs. By the very nature of the demands on the dental department of a general hospital the dental staff must be medically qualified, or at least medically minded. The training of the dental student today ensures that he has every opportunity of learning the importance of the medical attitude to dental disease.

It is difficult to follow the reasoning in your leader of Feb. 16 when you say that the setting up of a separate Dental Council will further alienate the relationship between medicine and dentistry. There are other professions, working in the closest relationship with medicine, which are nevertheless self-governing: what about the General Nursing Council, the Central Midwives Board, or the Pharmaceutical Society? Take the parallel case of the legal profession—consider the Law Society and the Bar Council. I see no reason for gloom and despondency in a recommendation which recognises the fundamental right of a profession to keep its own house in order.

Much nonsense is talked about the relative positions of the doctor and the dentist in the social scale of values. It should be remembered that the real standard of manhood is not what a man does but what he is, and I confess that I find an inferiority complex just as nauseating as the superior pharasaical attitude of some professional men. Let this snobbish pose be debunked wherever it is encountered.

The comparison between the pair of spectacles, the artificial limb, and the denture is plausible, but is it really practical? You can get your pair of spectacles and some artificial eyes and limbs off the peg. But if one thinks a moment of the patient's point of view can there be any doubt as to the answer? How would the patient view the set-up in which *she* was required to submit to one pair of hands for extractions, then to be told that the other department would refurnish her? The art of dental prosthesis has been closely linked to dental surgery throughout the ages. The modern treatment of faciomaxillary injuries demonstrates how close this link remains. That the making and supply of a set of artificial teeth has been held in the courts to be a transaction subject to the Sale of Goods Act may be only one more example of the asinine state of the law and of the folly of the litigant who has recourse to it.

Finally a word about the shortage of dentists. The same cry was heard in 1920 and the same fallacy in support of it was raised then. The fallacy is that the "public" is clamouring—the whole 40 millions of it—for dental treatment. When you have got your horse to the water you have still to make him drink. If the demand for dentistry grows it will be met, so long as decent working conditions are to be had by the practitioner. There is much to be deplored in dentistry as it exists today—public appointments are shockingly underpaid; the condition under which National Health Insurance dental benefit has been carried out in the last twenty years is, in the opinion of many dental surgeons, an abomination; dental research is the least considered of all branches of scientific inquiry; and the education of dental students leaves much to be desired. These are among the matters which must be attended to if the profession is to attract a good type of entrant; but let there be some regard for the history and traditions of the dental profession and some common sense in the building of the brave new world!

Aylesbury, Bucks. H. W. BREESE.

ERYSIPELOID

SIR,—Erysipeloid is comparatively common here amongst fish-workers, and follows pricking of the hands with a fish-bone. It occurs in both fish-packers and fishermen; and in the latter there is no doubt about the freshness of the fish, which is gutted immediately it is caught. The disease is self-limiting, and subsides spontaneously in 5–21 days, even if not treated.

Contrary to Dr. Hope Simpson's experience (Feb. 9) and in agreement with that of Dr. Barber (Jan. 26), I have found that sulphonamides have no effect, though they may appear to help in cases that subside spontaneously within a week. My last case failed to respond to a full course of sulphathiazole, but finally cleared within three weeks without further treatment.

Its short duration and the absence of constitutional symptoms in most cases probably account for the rarity of the disease in hospitals.

Grimsby. F. W. TABOIS.

SIR,—Both Dr. Singer and Dr. Barber et al. comment in your number of Jan. 26 on the rarity of this condition in Britain, and the latter authors are surprised at having seen seven cases in a few months.

I have seen many examples of this disease while resident assistant surgeon at St. Thomas's Hospital, and have records of 33 cases treated between August, 1944, and November, 1945: 3 followed cuts while handling live pigs; 6 occurred from injuries associated with meat; 9 from abrasions from rabbit-bones; 12 from scratches with fish-bones; 2 developed the disease after cat bites; and 1 man scratched himself on a poultry box. Several other cases were seen but the nature of the predisposing injury is not recorded.

The majority of the sufferers were housewives, with butchers as a close second; the usual history was of a definite cut or scratch, and, after an incubation-period of about one week, the erysipeloid developed: usually on the patient's first attendance the original injury was still visible though commonly scabbed over. Most often the cut lay on a finger, and the erysipeloid spread from this lesion proximally up the finger—preferring the thin skin of the dorsal surface to the coarser palmar skin—whence it frequently travelled across the web and spread along the adjoining digit; this curious "down one finger and up the next" spread I consider diagnostic. The majority of our patients complained, not of pain, but of a feeling of stiffness and tightness in the affected part, which had a mottled appearance, some areas purple and others dark red, with a poorly demarcated edge. Without treatment, the condition is self-limiting and lasts 6–8 weeks. In the cases I have seen there has been little or no general toxæmia, though in several cases the whole dorsum of the hand and even lower forearm were involved.

Unfortunately I was unaware that *Erysipelothrix rhusiopathiæ* is the accepted causative organism, and in a purely empirical manner tried sulphonamides; some cases were totally unaffected, while others showed partial improvement, but relapsed as soon as the drug was discontinued; local applications of heat, hypertonic saline, and ichthyol ointment were unavailing. I discussed the problem with Dr. Bauwens (in charge of the electrotherapy department) who drew my attention to the similarity of the lesion to the "triple response," and postulated that the condition arose from the entry of a foreign animal protein which set up an allergic reaction. Acting on this hypothesis, he treated 29 of these cases with local ionisation of calcium chloride and adrenaline on

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alternate days for an average period of 10 days (minimum 4, maximum 34), attaining cure in all. In view of this success, we felt we had solved the problem, and, despite Dr. Barber's far better results with penicillin on bacteriologically proven cases, I am still wondering whether the erysipelothrix is the sole cause of this disease. However, penicillin is obviously the treatment of election.

Brompton Hospital, London, S.W.3. E. G. DOLTON.

SIR,—While casualty officer at Charing Cross Hospital in the latter part of 1942 and the early part of 1943 I took a small part in the Septic Hand Clinic which had been started in the hospital some time previously. Writing from memory I should say that we treated at least two dozen cases in six months. The cases were almost invariably among kitchen-workers from the many restaurants in the Soho and Strand districts, and all gave a history of a prick, usually from a fish-bone or fowl-bone.

They were interesting in several ways. First, they never suppurated, and secondly, the greatest pain was always in the area of the joints of the fingers, leading the unwary to suspect a septic arthritis. Another interesting feature in our experience was the fact that the infection seemed to be self-limiting; no matter what local treatment was used it cleared up in about 21 days.

Beckenham, Kent. F. G. HERMAN.

HEALTHY GROUPS

SIR,—Much has been observed and written, by Schilder, Foulkes, Bion, Rickman, and others, about group therapy in illnesses of psychoneurotic and psychotic origin, but I cannot recall anyone drawing attention to the prophylactic effects of groups in civilian life.

For seven years, while I was in general practice, I was involved each winter in Gilbert and Sullivan operas performed by a cast of 40 drawn from a village of 1091 inhabitants, quite apart from a choral society of 30 singers in another village of 300 inhabitants. In addition, I had the usual bunch of Red Cross women whom I lectured weekly. (That was general practice, that was.) In retrospect I am amazed to recollect how exceedingly rarely the participants in these different groups ever got ill—during the "season," at any rate. Absenteeism from rehearsals, practices, and lectures was exceptional even in the 1929 and 1932–33 epidemics of 'flu, when I was visiting more than half the cottages in the neighbourhood. We never postponed a show; we never played an understudy—in fact, we never bothered to rehearse understudies.

Wise after the event, I am drawn to the conclusion that a group of people happily engaged in some purposeful creative activity maintains a high average of health. I am sure there must be other G.P.'s who, by force of circumstance or predilection, have had to undertake village or parochial activities, and it would be interesting to learn whether their experience has been similar to mine. GEORGE DAY.

"LET'S GO TO THE PICTURES"

SIR,—There was a small but important error, probably accidental, in Mr. Catterall's excellent article of Feb. 16, in which he says that the people who learn more easily from pictures than from the printed word form a *minority* of the school-certificate class from which medical students are drawn. One might quote Lord Horder's opinion that "we are most of us visualists rather than auditives" and point out the increasing tendency to illustrate textbooks. The importance of this mistake is that Mr. Catterall concludes from it that the production of factual films for medical students is "neither necessary nor desirable." Surely a most important use of the film is to bring together at one time and on one screen a number of "facts" in such a way that they can be integrated in the student's mind?

Mr. Catterall rightly draws attention to the possibility of students viewing films for themselves; this would remove a disadvantage from the film as used at present—that it is a group method of teaching. The standard (35 mm.) viewer now costs some £250; it is to be hoped that the substandard ones he mentioned will be far cheaper.

It is unfortunate that Mr. Catterall by implication ("the vital importance of sound") dismisses the silent film; for as you pointed out in your annotation of Oct. 13, 1945, there are some important uses for silent films in medical teaching. One of these is for the subjects "which could be adequately covered in very few feet of film" mentioned by Mr. Catterall himself.

Mr. Catterall in his forceful way says that the cost of first-class animation is "prohibitive." This is an exaggeration. The resources of the Disney studios are not needed. For the cost of *Six Little Jungle Boys* a very worth-while diagram film on the development of the body cavities could be made and would have lasting usefulness. In fact, as Mr. Catterall says of medical teaching films in general, "the undoubted expense" would be "well justified by the results obtained."

RONALD MACKEITH,
Chairman, Medical Committee,
Scientific Film Association.
London.

PROSTATECTOMY

SIR,—I apologise for once again making claim on your space. I thank Mr. Milnes Walker and Mr. Arthur Jacobs for their support. To Mr. Walker I would say that I have utilised on two occasions the intrapelvic approach to the vas, merely ligating it, however, without sectioning. The ligation of the vas, or vasectomy, at best merely prevents a transluminal descent of infection to the epididymis, and it appears to me infinitely preferable that the occasional inevitable abscess should point under the skin of the scrotum, where it is accessible, rather than in the depths of the pelvis. The latter could conceivably be of serious moment, and would certainly be difficult of diagnosis. I feel that the procedure should be condemned.

London, W.1. TERENCE MILLIN.

CORRECTION OF FACIAL PARALYSIS WITH TANTALUM WIRE

SIR,—The disadvantages of using tantalum in place of fascial strips to correct the deformity due to facial palsy, as described by Prof. Eastman Sheehan in your issue of Feb. 23, are that the tantalum ribbon tends to fragment, and to cut out. The result to patients can be at least one extra operation and several months' delay before the deformity is corrected by the use of another method.

A recent visit to over twenty plastic centres in the United States showed me that there was wide interest in the tantalum method, and in its complications. Full credit was given to the military plastic centre at which the method had first been explored and given an extensive trial, and from which reports of these complications had been provided for other plastic centres.

Fascial strips, and, for selected cases, the mobilised masseter, continue to be the most generally used methods for correcting the deformity of seventh-nerve palsies. It is possible that a rôle of usefulness in the treatment of facial palsy will be defined for tantalum. Its use is still experimental. But an indication of the incidence of complications, and above all evidence of the moderately late results in cases treated, should I suggest be added to any account of the method today, some two or more years after its first introduction.

London. PATRICK CLARKSON.

CONGENITAL DEFECTS FROM GERMAN MEASLES

SIR,—I read with great interest your leading article of Feb. 9, and strongly support your plea for an early inquiry. The article is a great advance on your last annotation on the subject, which, in my opinion, overstressed the difficulties likely to be met with in such an investigation.

In my recent Blair-Bell lecture I discussed the association between congenital defects and German measles, pointing out that although many pædiatricians in this country have seen isolated examples of this association (I myself have seen two), the largest number of cases had been reported by Martin. By means of a questionnaire Martin, whose contribution you do not mention, found that out of a total of 85 deaf children born during 1940–41, the deafness in 13 was due to meningitis, and in 7 was hereditary, but 24 of the mothers of the remaining 65 children suffered from rubella during the first four months of pregnancy, and 6 other mothers probably contracted it.

Although considerable evidence can be obtained in a short time by the methods you suggest, the complete proof that German measles in early pregnancy is a cause

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of congenital defects will require long and carefully controlled observations. All investigations so far have been retrospective in the sense that, a congenital defect having been observed, inquiries have then been made as to the occurrence of German measles during pregnancy. In future the reverse procedure must be adopted—i.e., women known to have had German measles during pregnancy must be followed until the birth of their children, and the incidence of congenital abnormalities noted. Two other groups of mothers must be similarly investigated: (1) those who have suffered from other virus infections, such as measles, during pregnancy: and (2) those who have not suffered from any infectious disease during pregnancy.

Birmingham. LEONARD G. PARSONS.

THE DOCTOR'S PLACE

SIR,—It would be most unfortunate if either the Union manifesto or your leader last week led to the belief that those at present concerned with hospital administration and management in a non-medical capacity desired to exercise any control over the professional staff of the institutions they serve. They would agree with you that control of the medical staff by a "master" is indefensible, and they would share the view of most of the medical profession that autocratic control by a medical superintendent is hardly more tolerable.

Non-medical administrative officers, in voluntary and in local-authority hospitals alike, are at one in the view that what may perhaps best be described as the business management of a hospital should be entrusted to someone who has trained for and specialised in that work; that such an officer in his powers and functions should resemble the house-governor of a voluntary hospital; and that, like the house-governor, he should be responsible directly to the hospital committee. Administrative ability—certainly not lacking in many medical men called upon to exercise administrative functions—is essential in the business manager, but it is not enough. For full efficiency the business manager must have had years of training and experience in such work, just as the doctor has in clinical medicine before becoming a fully qualified specialist or thoroughly competent general practitioner. Moreover, it should be noted that the acceptance of this principle would not exclude the medical man from non-medical administrative functions, or from the business administration of a hospital, but would simply require him to qualify in such specialty.

The problem of the future pattern of internal hospital administration is now one of considerable urgency, for it is inconceivable that at least three different types of administrative set-up will be permitted to remain indefinitely in a fully coördinated national hospital system. As you say, most doctors agree that the hierarchical system must go, which means the abolition of the post of "medical superintendent" as we now know it, possibly with the substitution of a medical coördinator. This abolition of the *medical superintendent* as controlling head of the medical services—to perform which rôle was the original justification for substituting a man with medical training and qualifications as the autocrat of the institution in place of the old lay autocrat, the master—surely makes it unreasonable that a medical man without the necessary training and experience should be put in charge of the business management or non-medical administration of the hospital. Medical superintendents are themselves appreciative of the weaknesses of the present local-authority system of hospital administration, and some of them have already sought to limit themselves as far as practicable in the present circumstances to the functions of medical coördinator. That seems to point the way to a possible solution to the general problem. Let the existing medical superintendents become the first medical coördinators—possibly with a happier title—with, as at present, direct access to the hospital committee, and let the existing senior non-medical administrative officer become *house-governor* responsible for the business management of the hospital, also with direct access to the committee.

It is not appropriate in this letter to consider in detail the precise functions of the medical coördinator and his relations with his professional colleagues, but it is apparent that there will be many duties that will properly fall to such a coördinator, who, relieved of purely non-medical administrative responsibility, might also have reasonable time to devote to his own medical or surgical specialty, becoming a *primus inter pares* on the senior professional staff. The method of future appointments to the office of medical coördinator also offers an interesting field for speculation. On the retirement of existing medical superintendents, might not the office be filled by the responsible authority on the recommendation of and from among the senior professional staff of the hospital concerned, for a maximum period of three years at a time? The coördinator thus appointed would act rather as the chairman of the medical committee of a voluntary hospital does now, but with the added advantage of being a whole-time officer.

Your leader also referred to a suggestion that medical officers of health need not necessarily be doctors, and that perhaps the appointment of a layman to this office would be desirable. I should have thought that medical and business administrative coördination were both essential at all levels, and personally I should view with dismay the disappearance of the medical coördinator at the county or regional level. On the other hand, might it not be desirable to have also a trained and experienced hospital administrative officer working alongside the medical officer of health at county or regional level, with which officer the house-governors would be in contact just as the medical coördinators would be in contact with the medical officer of health, both having direct access to the county or regional committee or board?

S. R. SPELLER.
Secretary.

Institute of Hospital Administration,
12, Grosvenor Crescent, London, S.W.1.

A DIFFERENT KIND OF MATRON

SIR,—This is not the first time that the question has been discussed whether a matron should be a nurse or a member of another profession, and no doubt it will not be the last. It is good that the subject should be considered from time to time. But I am a little concerned at a tendency which appears to be growing more and more general. When anything is found to be unsatisfactory in matters which at present come within the sphere of the nursing staff, the tendency is to assume that the cause of the trouble is to be found in the fact that the responsible head is a nurse and that the remedy is to appoint someone without a nursing qualification.

If all is not well with a public school, is the trouble traced to the fact that the headmaster is a member of the teaching profession? Do we hear recommendations that an architect or a barrister should be appointed instead? The headmaster may fail because he has not the personality for the job or because he is a poor administrator or because he has been the victim of circumstance. But he is always succeeded by another teacher. Are we to assume that the nursing profession cannot provide women of suitable personality for the higher administrative posts, or that there is something in a nursing career which renders them unfit for leadership? Obviously, if we deprive the profession of the opportunities of promotion to posts of responsibility, we cannot hope to attract into it women with the ability to carry responsibility and to wield power. It is true that in the past trouble has often arisen because individuals inadequately equipped for leadership have been appointed to responsible posts and have had to "bluff through," but the remedy is to recruit into the nursing profession more of the right type for leadership, as we are trying to do through the Nursing Recruitment Service, not to assume that nurses cannot lead.

H. MORLEY FLETCHER,
Chairman.

Nursing Recruitment Committee,
21, Cavendish Square, London, W.1.

EX-SERVICES MEDICAL SOCIETY

SIR,—In view of the spate of letters on difficulties encountered by returning Service doctors, it is suggested that a medical society be formed immediately for medical men and women who served in the Forces during the 1939–45 war. Such a body could watch over the interests of the returning doctors during their resettlement in civilian life. If this proposal finds favour, perhaps someone could arrange a preliminary meeting.

EX-SERVICE M.O.

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SMALLPOX FROM RETURNING SERVICE MEN

SIR,—I am the R.A.M.C. officer who was responsible for the two cases of smallpox in Hampstead (*Lancet*, Feb. 23, p. 288), and I think it advisable to direct the attention of practitioners to the extremely modified form that this disease assumes in the well-vaccinated. I was vaccinated in infancy, in 1931 when a medical student, in 1941 on joining the Army, in 1944 (May), and finally on Jan. 2 of this year. Nevertheless I contracted smallpox; the incubation-period was 17 days till the fever of onset, which fever was ascribed to the heavy coryza I had at the time, and was not serious enough to warrant my going to bed. The rash started to appear 3 days later. It consisted in all of three papules, of which only one scabbed over, the whole process taking 4 days. Even after the event, I think it impossible to have made a diagnosis on these three spots; but the subsequent infections in my family leave no doubt whatever as to their true nature.

In view of the ever-present danger of variola outbreaks in this country, with so many men returning from endemic areas, it would be an excellent safeguard if the families of all personnel expected back from the East were vaccinated in good time *before* their arrival.

SADDER BUT WISER.

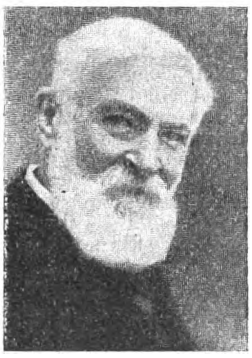
TREATMENT OF SYPHILIS WITH PENICILLIN.—Colonel L. W. HARRISON points out that in describing the Royal Society of Medicine's discussion on this subject (Feb. 23, p. 270) we credit him with the statement that pure penicillin is shortly to become available. What he said was that *purer* penicillin is shortly to become available. As he remarks the difference between "pure" and "purer" is in this connexion important.

Obituary

ADOLF LORENZ

M.D.

THE death of Professor Lorenz in his 93rd year is reported from Vienna. He was a man of great natural gifts, but his final commanding position in the orthopædic world was not reached without much effort. The son of a poor Silesian artisan, he was brought up as a child in a Benedictine monastery, and his autobiography describes how he had to pay for his free place there by giving his services as a chorister. He would certainly have become a clergyman, like his uncle, if he had not been sent to finish his schooling at Klagenfurt where he decided to take up medicine. Eventually he made his way to Vienna, and after assisting for a time in the anatomy department of the university he obtained his first surgical post as assistant to E. Albert in Dumreicher's clinic in 1880. Then came one of those twists of fate that settle the direction of a surgical career. It was not long after the introduction of Lister's carbolic spray, and Lorenz felt it his duty to make use of this ritual; but it produced in him a severe recurrent eczema of the hands which made operating impossible. He was in despair and was about to abandon surgery when he was advised to give up operative methods in favour of manipulative and corrective methods. He had already written a monograph on flat-foot and he naturally turned to orthopædic work, in which new fields were opening: at the same clinic, in 1881, his colleague Nicoladoni had performed the first operation of tendon transplantation in Europe.



Thus the whole trend of Lorenz's development was altered, and orthopædic surgery the world over became the gainer by such fundamental procedures as the manipulative or bloodless method of reduction of congenital dislocation of the hip, to which he turned from the open operation he had developed with Hoffa. He did fundamental work on scoliosis, on the conservative treatment of hip disease, and on spondylitis, for which he introduced the use of the plaster bed. In 1884 he became assistant professor in the University Clinic of Vienna and head of the department of orthopædic surgery; and it was 40 years before he retired in 1924 as full professor. In 1919 he first described his bifurcation osteotomy for various disabilities of the hip-joint and upper end of the femur, which in its numerous modifications has become a standard procedure wherever orthopædic surgery is practised. In his five decades of clinical activity he was a fertilising influence on all branches of orthopædic science. He made fundamental observations on club-foot, on genu valgum, on arthritis of the hip, and on the muscles in normal posture and disease. Nevertheless it is with congenital dislocation of the hip that his name will be chiefly associated.

Lorenz not only had a good brain but knew how to remain objective and impartial, and by his skill and unrivalled experience he was able to bring manipulative methods into high repute. In this he was aided by a talent for public speaking: his impressive demeanour and descriptive power left their mark not only on his own pupils but on his many visitors from abroad.

FREDERICK RUFENACHT WALTERS

M.D.LOND., M.R.C.P., F.R.C.S.

Dr. F. R. Walters, who died at Farnham on Feb. 22 in his 89th year, spent his life in the institutional treatment of tuberculosis. He qualified from St. Thomas's Hospital in 1880 and took his M.B. with honours the following year. In 1882 he obtained his B.S., when he was awarded the gold medal and a university scholarship in surgery. After holding house-appointments at St. Thomas's he was appointed lecturer in physiology to the Zenana and Medical Mission Training School at Westminster and surgeon to the Westminster General Dispensary. Though Walters had taken his F.R.C.S. in 1882 he was at heart a physician, and while holding a lectureship in physiology at Exeter Hall he joined the staff of the North London Consumption Hospital at Mount Vernon. Here he was visiting physician in 1896, when the open-air method of treatment was introduced and Otto Walther's medical patients were returning from the Black Forest to set up replicas of Nordrach on half the lonely hills in Britain. Quick to realise the benefits of this vigorous technique, Walters ran Crooksbury Sanatorium at Farnham for many years almost single-handed, combining in his own person the work of administrator, clinician, pathologist, dietitian, and recorder. And this versatility lent authority to the advice he gave to physician and patient in his *Open-air or Sanatorium Treatment of Pulmonary Tuberculosis*, first published in 1909. He was urgent that the technique should not come into disrepute through misuse, and he urged that each sanatorium should have two sections—one for patients requiring absolute rest and another for ambulant patients requiring physical training by graduated exercise. Walters knew what was being said and done at other institutions at home and abroad, and his *Sanatoria for Consumptives* described the work of all the important centres. His interest in comparative statistics led him to read a paper on the classification of cases at the International Tuberculosis Congress at Rome in 1912.

One of his former assistants writes: "Walters's versatility was matched by the confidence which his patients placed in him—many of them influential and distinguished people. And this was the more remarkable because he was then a martyr to migraine and never physically robust. The last of his kind, Walters's passing may fittingly remind the therapeutists of a new era of the debt they owe to such painstaking pioneers."

THE National Council of Social Service has lately published a handbook of advice and information for those who wish to help old people. *Old People's Welfare* may be obtained from the offices of the council, 26, Bedford Square, London, W.C.1 (1*s.* 6*d.* post free). The National Old People's Welfare Committee which was responsible for compiling the handbook is also holding an exhibition of plans, photographs, and models on the same theme at County Hall, Westminster, S.E.1, from March 11 to 23. The exhibition will later go on tour.

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PSYCHIATRY AND THE PUBLIC-HEALTH SERVICE *

Sir LAURENCE BROCK, C.B.

LATE CHAIRMAN OF THE BOARD OF CONTROL

PSYCHIATRY has scarcely begun to share in the dvances made in other branches of medicine. In ental hospitals the aggregate recovery-rate and the ischarge-rate have remained obstinately constant, and this as induced among psychiatrists a pessimistic attitude.

Another factor which has contributed to their pessiism is that psychiatry is a battleground for warring ects. The physiological school traces all mental disrders to physical and biochemical causes, whereas he psychological school attributes all mental trouble to he unconscious. In addition, the psychological school itself far from being united.

A third factor promoting pessimism is the entanglenent of psychiatry with the law. The necessity of placng restrictions on the mental patient's liberty has led o the imposition of legal safeguards, more rigorous in our wn country than in most others, which are inevitably rejudicial to mental medicine. The fact that these estrictions cannot be imposed without the authority of lay justice has far-reaching reactions. It perpetuates n attitude of suspicion which prejudices the relation f the patient and the doctor; but much worse than this s its reaction on the general public.

The reaction which entanglement with the law has ad on psychiatrists makes them feel that they do not njoy the confidence of the public to the same extent s do other branches of the profession. This puts them n the defensive, and it tends to emphasise the isolation n which so many psychiatrists live, an isolation fostered y the remoteness of many mental hospitals and by the gnorance of psychological medicine shown by the great najority of general practitioners. It is unfortunate hat many mental hospitals are "off the map." Mentalospital doctors have too often little opportunity of ontact with practitioners in other branches. They ive "over the shop," and their physical isolation tends o become a spiritual isolation.

Handicapped by their sense of isolation and by the onsciousness of the distrust of the public and the ndifference of the rest of the profession, it is small wonder f some psychiatrists view with suspicion any attempt o unify the control of the various health services, and f they feel that they will not be given a "square deal." But some measure of unification is urgently needed.

The solution of this problem is not the development of ndividual institutions but rather the devising of a ystem under which psychological medicine can be ffectively integrated with general medicine, and mental ospitals and ancillary institutions with their staffs rought into closer relation with the rest of the ublic-health service. The difficulties are formidable hough not insuperable. On the one hand there are the nen in the mental-hospital service conscious of their loofness from other health services in their area and exhibiting that sensitiveness to criticism which isolation ends to produce. At the same time they find themselves faced under the white-paper with new responsibilities which they have never contemplated and for which not all of them are adequately trained. On the other hand there are the general hospitals desperately in need of the help psychiatrists can give them, though they are not yet in many cases conscious of the extent of the need.

TRAINING

The question can therefore be approached from two angles: how to train the men who are needed, and how to secure that, when they are trained, their services are fully utilised.

Once we know for what purposes the psychiatrist is to be trained, we shall be able to devise a method of training. If we can be clear what we want, a way of getting it can always be found.

What do we want the psychiatrist to do? Here, I suggest, the white-paper and the report of the Royal College of Physicians give us the answer in broad outline. First we have to rid our minds of the old idea that the psychiatrist is primarily an institutional doctor. That is altogether too narrow a conception to be fitted into the new scheme. In the future, psychiatrists of the public mental-health service will be in the service of the health authority and available for whatever duties may be required of them. They will provide the consultant service in conjunction with such psychiatrists in private practice as may wish to take a share in this work.

But more important than the consultant service are the reorganisation and extension of the outpatient service. Though great progress had been made before the war in the development of this service, the sessions were far too infrequent and the centres too few. In future it will not be left to a harassed superintendent to decide how many sessions he or his deputy can take, too often at the expense of their scanty leisure. The question for the health authority to decide will be where centres are needed, not how many can be staffed. In other words the staff will be determined by the needs, instead of the needs being conditioned by the availability of staff.

Not every doctor in the mental-health service is suited temperamentally or by past training for outpatient work. Obviously the young men must begin in mental hospitals under proper supervision and guidance, and even among the older men there are bound to be some who can best be employed in institutional work. But the point I want to emphasise is that in recruitment and training the object is to produce men who can take a full share in extramural work. The problem is the staffing of a service and not of a particular hospital. This means some modification in the doctor-patient relationship. Many doctors will only be part-time in the hospital, and their relationship to the patients in the wards will approximate to that subsisting in a general hospital. The old-time paternalism will tend to disappear, and with its disappearance something valuable will be lost. But the only alternative would be a complete separation between the institutional and the extramural staff, a separation which, even if practicable, would be thoroughly bad for both.

If this is agreed, the problem of training, which includes postgraduate medical education besides clinical practice, becomes clearer. The objective is to recruit and train men qualified both for inpatient and outpatient duties and, in the later years of their service, for consultant and administrative work as expert advisers to the health authorities. The new entrant should be treated as a cadet—i.e., someone having the status of an officer but still needing instruction and supervision. Though he will have definite duties, they will not take his whole day, and he will have some time for study. It should be regarded as an important part of the duties of the superintendent to supervise and train his young men. If after a sufficient trial the novice shows promise and an aptitude for psychological medicine, he should then be drafted to a centre of postgraduate instruction. I feel strongly that this should be the second stage and not the first, for it is difficult, if not impossible, to determine whether a young doctor is worth postgraduate training until he has lived in a mental hospital long enough to decide whether he likes the life or not.

This brings me to the far more difficult question of the proper training of consultants. Here I suggest that the proposals put forward in exalted medical circles for

* Abridged from the Maudsley lecture delivered before the Royal Medico-Psychological Association on Nov. 30, 1945. The full text will appear in the *Journal of Mental Science*.

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defining the qualifications required before a psychiatrist is to be recognised as of consultant standing are too remote from reality to be altogether helpful. The olympians of Harley Street forget that there are only a handful of men in the country who fulfil the conditions which it is proposed to prescribe. Yet, under the white-paper, health authorities will be required to provide a consultant service everywhere, not merely in the fortunate cities which possess a university and a medical school. This service must be supplied almost entirely from the mental-health service.

Apart, therefore, from the consideration that the mental-hospital staff have the advantage of a far wider range of clinical material, outside of a few special areas the mental-hospital men are bound to monopolise the consultant service for the simple reason that there is no competition. If, therefore, almost all the consulting work is done by psychiatrists from the mental-health service, why not call them consultants? Common sense demands it, and it is an administrative necessity, since they are the best men available for the job.

THE DIPLOMA

There is much in the report of the committee of the Royal College of Physicians which will command general agreement. I imagine that everyone will agree, at least in theory, that there ought to be a uniform D.P.M. It is indefensible that some of the examining bodies, whatever their motives, should offer the students a "soft option," with the inevitable result that all but the most ambitious are tempted to take the easiest course. Few will dissent from the suggestion that candidates should be required to spend a longer period in psychiatry before being allowed to sit for the examination; and there is much to be said for requiring more time to be spent on a study of the neuroses. So far the committee are on strong ground. As a general proposition the need to raise the standard will hardly be contested. The real difficulty is to determine how far the standard can be raised without producing repercussions in the mental-health service which the committee appear to have ignored. The D.P.M. was not meant to be and ought not to become an honours examination. On the contrary, it is a qualification which all future entrants into the mental-health service should be required to take as a condition of promotion to a senior post. There would be obvious advantages in providing a higher qualification for men who intended to seek professorial or other teaching posts or to become advisers to the mental-health committee of the new health authorities. But to convert the D.P.M. into an honours examination will limit the number of candidates. Only the keenest students will take it, and the rest will lose the incentive to study which the present D.P.M., unsatisfactory as it is, has hitherto given them.

Nor is this the only danger. It seems to be implied in the report of the committee that only men who take the five years' course are to be regarded as psychiatrists. This in my view would be disastrous. It divides the medical staff in the mental-health service into two castes: a small number of high-caste men who are to be graded as psychiatrists and to rank as consultants, and a much larger number of "untouchables." As a basis of organisation it is thoroughly unsound, and its psychological effect would be disastrous. I suggest that, leaving out of account pre-registration house-appointments, all doctors working in the mental-health service ought to be psychiatrists or on their way to becoming so.

PRIVATE PRACTICE

I find many reasons for hoping that private practice in psychiatry will continue, not the least important being that it would facilitate a scheme which I have long had in mind for putting some of the staff of at least the larger mental hospitals on a part-time basis. Here I am touching on a subject in which controversy is all the more embittered because, up to a point, both sides are right. Many mental patients will spend the rest of their life in institutions, and therefore the custodial aspect of the work assumes an importance which does not obtain in any other type of hospital. From the point of view of custodial care, the conception of the mental hospital as a compact family unit in which the staff share the recreations and life of the patients has a real value. Doctors who live in can and often do acquire a knowledge of their patients which no visiting staff can ever possess. This sense of solidarity, the feeling that staff and patients alike belong to one great family, has at its best many valuable features. But I am convinced that, however much living in conduces to better custodial care, a long price has to be paid for these advantages. I have seen too much of the effects of the non-resident system in Continental hospitals to advocate putting all the staff on a visiting basis. But I am not convinced that, because some part of the staff must be resident, all need be. I see no reason why some compromise should not be possible which in some measure would combine the advantages of both systems.

On one point I think there will be general agreement. No doctor should be allowed to live out until he has had some experience of living in. Young medical officers cannot properly understand the special difficulties of life in a residential institution until they themselves have lived in one.

Part-time employment and freedom to live out would increase the number and improve the distribution of psychiatrists in private practice, and it would help to improve recruitment by bringing in men who are attracted to psychiatry but not prepared to accept an institutional life for themselves and their families for the whole of their career. Admittedly this involves some differentiation of function in the higher ranks of the mental-health service, but it would bring in an element, the independent and adventurous type, which is at present lacking.

PROMOTION

If we are to aim at making the mental-health service more attractive by offering a choice of alternatives in the later stages, there is one other change which calls for consideration. At present far too many of the prizes go to successful administrators. The man who can run the machine and manage the committee gets the top post. Under the present system that is inevitable. Men and women in public life are shrewd enough judges very often of administrative capacity, and even if they were competent to appraise clinical skill, which they usually are not, they would still prefer the man who can manage staff and who exhibits good judgment in administration to the man who is a clinician pure and simple.

I suggest that the difficulty might be met by creating a post of senior physician without any administrative duties, except perhaps in the absence of the superintendent, such posts to carry the same salary as that of superintendent, though the latter might be given an allowance in the nature of "table money" to cover the expenses of hospitality which fall upon him. I recognise that this involves a kind of dyarchy, and a dyarchy brings its own difficulties and is not always a stable form of government. But I cannot believe that a proper demarcation of function is unattainable, and the suggestion gives a fairer chance to the clinician.

ORGANISATION

Turning now to the question of machinery, I want to make it clear that I have no authority to make any definite statement in regard to details of the layout. I can only indicate what seem to me the implications of the white-paper. I assume that under the health authority which has general responsibility for the control of all health and hospital services in its area there

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will be at least two committees: a public-health committee, with the medical officer of health as its expert adviser; and a mental-health committee, also with an expert adviser. The health authority, at least in the larger areas, will presumably have as its adviser and chief executive officer a director of medical services. This should be the ultimate objective, but at the start it may be impracticable in some areas.

It is a feature of the mental-health service that it requires for its economical administration a large unit of population. To secure proper classification without resort to small wards, which are needlessly expensive to staff, a mental hospital of about 800 beds is necessary, a figure which corresponds closely to a population of 250,000. There may be areas in which the desirable minimum population may not exist. In such cases the medical officer of health may become also the director of medical services. But such cases will, I hope, be comparatively rare, and it is better for present purposes to consider the organisation in what may be called the normal areas, which can afford the kind of staff I have adumbrated. Even in these areas there may have to be all kinds of provisional arrangements in the transition period, for the reason, among others, that men with the all-round qualifications needed for the director of medical services hardly exist at present and will have to be trained. Once their functions are defined and the need is understood, training is only a question of time.

The fear expressed in some quarters that the new organisation will put the mental-health service under the control of medical officers with no experience of mental-health problems seems to me exaggerated. At the start it may happen here and there, but I believe it to be merely a temporary difficulty incidental to the transitional stage. Occasional friction, especially at the start, is inevitable, but this does not invalidate the principle.

CURRICULUM

No substantial addition to the undergraduate curriculum is practicable at present, desirable as it certainly is. There is general agreement that the present curriculum affords pitifully little training in psychological medicine, but there appears to be no escape from the dilemma that little addition can be made to the present curriculum without lengthening the period of training, which in turn means increasing its cost and narrowing the field of recruitment.

The Goodenough Committee have made valuable proposals for the development of a psychiatric department in every teaching centre and for giving the undergraduate some grounding in the importance of psychosomatic conditions and some clinical clerking in out-patient clinics, where he will see the beginnings of mental trouble, in partial substitution for the demonstration of acute psychoses, which the general practitioner will not often meet and will still less often attempt to treat. These proposals if they are adopted will mark a substantial advance, but they will not lessen the need for postgraduate training of men entering the mental-health service. At the same time, the Goodenough Committee's proposal for a pre-registration year to be spent in clinical work in hospitals will be of great value if students can be induced to spend at least part of the year between qualification and registration as clinical assistants in mental hospitals or psychiatric departments. But even allowing for this, men who intend to take up psychiatry will have to get their training for the most part in the post-registration period.

The Goodenough Committee have approached the question from the point of view of the general hospital. I suggest that the question needs to be approached from a wider point of view. If we are to produce men qualified for the varied duties of medical officers of mental health, they must be given opportunities of gaining experience in all branches of mental-health work. Such a comprehensive training is equally necessary for those who are to take charge of psychiatric units in teaching centres or of child-psychiatric clinics. Experience in a mental hospital is not enough. It would conduce to this end if every medical officer were required, as a condition of promotion to the rank of deputy, to have spent a minimum period, say two years, in a mental-deficiency institution. Similarly, medical officers on the mental-deficiency side should be required to spend a minimum period in a mental hospital. As the majority of local authorities now possess both types of mental institutions, this interchange need not present any great practical difficulty. I am not suggesting that the two branches should be regarded as convertible. On the contrary, they naturally appeal to different types of mind. What is wanted is that the younger A.M.O. should have an opportunity of gaining experience of all types of mental abnormality and of modern methods of dealing with them.

From this arises the need for some modification of the D.P.M. curriculum. If all medical officers are to be given experience both of mental disorders and of mental deficiency, the D.P.M. should include both, instead of offering alternatives as at present. The possession of a diploma or of some other evidence of postgraduate study in psychiatry ought ultimately to become a condition precedent of promotion to the higher ranks in the mental-health service. I say "ultimately" because the immediate enforcement of such a rule would be unfair to many men who have passed the age at which examinations afford any true test of knowledge and experience.

APPOINTMENTS

This brings me to the difficult question of how such a rule can in practice be enforced. Probably few would question the desirability in the abstract of requiring candidates for the higher posts to obtain some postgraduate qualification in psychiatry, though I can imagine sharp differences of opinion about what qualifications should be recognised. But medical officers of public mental hospitals are the servants of, and appointed by, local authorities. How, then, is this rule to be reconciled with the traditions of local autonomy and the right of local authorities to choose their own men? To give the Board of Control the power to appoint is clearly inadmissible. This would be repugnant to the spirit of local government, and it would impose on the board a responsibility which ought not to fall to any central department. But I suggest that there would be nothing incompatible with local autonomy in requiring the board's approval to all appointments of superintendents and deputies, subject to an appeal to the Minister if the local authority felt that the veto had been unreasonably exercised. But an alternative which might be more acceptable to public opinion would be to provide for the appointment of an independent selection board to draw up the short list of candidates from whom the local authority would make their own selection. The principle of an advisory committee for appointments to hospital staffs has been endorsed by the Goodenough Committee, and there is no reason why it should not be extended to mental hospitals, with suitable provision to secure that advantage is taken of the unique knowledge and experience in this matter of the Board of Control.

RESULTS OF UNIFICATION

A point of great importance is that the establishment of a mental-health committee will secure what the Feversham Committee recommended, and the Board of Control have long advocated: the unified control of all mental-health services except child guidance, which will be shared with the local education authority. But this is not the only advantage. As the new health

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authorities will be responsible ultimately for all hospital services, it will be possible to secure far more effective coöperation between mental and general hospitals. The general hospitals will be able to provide consulting physicians and surgeons, besides specialists who will visit the mental hospitals regularly as part of their ordinary duties. Similarly, the psychiatrists from the mental hospitals will be on the staff of the general hospitals, entering as of right and not just occasionally by invitation.

As under the Mental Treatment Act any mental case, provided the patient is not certifiable, can be treated in an approved general hospital, there will be a wider choice of institution to which the patient can be sent, a choice determined solely by clinical considerations. The experiment of treating in general-hospital wards cases presenting no behaviour difficulties and not likely to need long-continued treatment has already been tried with sufficient success to warrant its development; and this may prove to be the best way of dealing with those patients suffering from neuroses or psychoneuroses sufficiently serious to call for inpatient care who would refuse to enter a mental hospital. In any case the closer linkage between the mental and general hospital ought to mean that the psychiatrists on the staff will be given control of some of the beds, and will rank as full members of the staff, and be represented on the medical committee.

This coöperation between mental and general hospitals becomes far more important in the case of the medical school. It has long been a reproach that our medical schools, at least until the York Clinic at Guy's was established, did not include a psychiatric unit. But though in principle the idea of a psychiatric unit as an integral part of the teaching centre appears to be generally accepted, it is not without certain dangers. If too many hopeful and recoverable cases are concentrated in psychiatric units of teaching centres or in psychiatric wards in the larger non-teaching general hospitals, there is the danger that mental hospitals will lose many of their admissions and be left mainly with seniles and the certifiable cases. It would be disastrous if mental hospitals came to be regarded as merely a receptacle for violent or hopeless cases. There must therefore be some means of securing a fair distribution of cases between the psychiatric units or wards and the mental hospitals in the area.

A second difficulty is that, as psychiatric units are required for teaching purposes, there may be a tendency to pass on to the mental hospital any case which is thought to have reached a stage at which it has ceased to be of clinical interest. Clearly some measure of transference between the two is unavoidable. There must be a constant inflow into the teaching unit, and not all cases, however carefully selected, can be treated to recovery. But such transfers must be regulated with due regard to the welfare of the patients as well as the needs of the students. Perhaps a partial remedy may be found in arranging for the senior psychiatrists of the mental hospital to form part of the staff of the psychiatric unit, instead of the two medical staffs being entirely distinct.

RESEARCH

Another function of the psychiatric unit is to act as the focal point in the organisation of clinical and laboratory research. The university and its medical school form the natural and best centre of clinical research, as they obviously form the best centre of laboratory research. Hitherto development in this direction has been hampered by the difficulty of providing clinical material. In some schools the teacher of psychological medicine has been a consultant in private practice with control of perhaps five or six beds and without access to the mental hospital. In other cases he has been an overworked medical superintendent with access to almost unlimited clinical material and no time to use it.

Good research work, including clinical research, has been and continues to be done in mental hospitals; but the fact that enthusiasts, often at the expense of what should have been their leisure time, have done valuable scientific work does not prove that the organisation is sound. The problem is to create conditions which encourage scientific work; and to do this it is necessary to offer the research-worker a reasonable career. The man who takes up research merely to make a living will never be worth much; but if the born research-worker is not given a sufficient salary to enable him to live in decent comfort and to educate his children he will inevitably be tempted away into other and more remunerative work, not because he is a "gold digger" but by sheer pressure of domestic responsibilities.

I do not mean to suggest that there is necessarily any dichotomy between research-workers and clinicians. Even in pure laboratory research the worker needs a clinical background, and in clinical research experience, and often long experience, in the wards is essential. To my mind one of the great advantages of the psychiatric unit is that it gives the physician at the head of it time to study and to think, to write, and to teach. How can this be expected of a busy superintendent who has to pacify the matron, listen to the clerk and steward, sign certificates and endless letters to anxious relatives, and perhaps spend the rest of the day grappling with temperamental architects or conscientious commissioners?

We are far from having devised a satisfactory apportionment of responsibilities between the superintendent and the lay administrative staff. In a few cases efforts have been made to relieve the superintendent by assigning to a lay administrator certain duties which elsewhere are discharged by the superintendent. Some measure of devolution to a lay administrator is clearly desirable; but, if such devolution is to succeed, it will be necessary to recruit a more highly trained administrative personnel than is generally available at present.

The case for linking the university and the medical school with the mental hospitals is even stronger as regards laboratory research, which nowadays is a matter of teams rather than of individuals. It calls for organisation and lavish equipment. The days of the lonely genius working feverishly in a leaky shed have ended. What is needed in each area is a plan, directed by the university through the faculty of pathology working in close collaboration with the psychiatric unit and the mental hospitals, under which what can best be done at the centre will be assigned to it, and the mental hospitals will coöperate by undertaking such part of the investigation as their staff and equipment fit them to undertake.

I am not suggesting that routine testing should be subject to any kind of outside control, but even here it should be a great help to the mental hospitals to have the university to appeal to in any case of difficulty. Nor would I discourage young medical officers from working independently, provided they first consult the research bureau of the association. There is much to be said in favour of encouraging the medical staff to undertake any investigation which appeals to them, because it helps to keep their scientific interest alive and so counteracts the soul-destroying effect of too much routine work.

THE PSYCHIATRIST AND SOCIETY

Two directions in which the psychiatric service is likely to expand are worth noting here: contact with the courts, and contact with the Ministry of Labour. It may be expected that the main provisions of the Criminal Justice Bill will be reintroduced, and the natural and most obvious method of providing the courts with advice and reports on any cases in which there is prima-facie reason to believe that criminal acts have been due

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to the accused's mental condition would be through the psychiatric consultant service. I do not think that the health authority is the best body in all cases to provide any treatment that may be necessary. The treatment of delinquency is best left to psychiatrists who have specialised in it sufficiently to have acquired an appreciation of the mentality of delinquents.

Contact with the Ministry of Labour is likely to become of increasing importance. There is evidence of a growing realisation by labour-exchange officials that constant changes of employment and failure to get on with any employer may be due to psychological factors. The difficulty may be temperamental, but it may also be due to the wrong choice of employment. The matter is important, because the man who is constantly changing his job is apt to end by becoming a chronic unemployable whom nobody wants. Vocational guidance will probably remain within the province of the industrial psychologist, but it may well be that psychiatrists will be increasingly used in civil life, as they have been in the Army, for personnel selection.

Public opinion is becoming more alive to the value of psychiatry not merely as a method of treatment but also as a practical aid in everyday life.

All these new developments which I have outlined mean a gradual shifting of the centre of gravity. The mental hospital must remain an essential part of the mental-health service, but there will be a growing emphasis on the preventive side of mental medicine, and institutional treatment will cease to dominate the picture. The preoccupation of visiting committees in the past with the mental hospital, which meant to a large extent preoccupation with end-results, was contrary to the whole conception of preventive medicine. The mental hospital has an essential part to play in the scheme but only as a part of something far bigger and more comprehensive.

CHILD GUIDANCE

There is one part of the field in which unification has not been achieved and seems unlikely to be achieved at all completely, and this is child guidance. It is in this sphere that the mental-health service comes nearest to preventive medicine. Unfortunately it is impossible to frame an ideal scheme, because the problem is not purely medical. It is partly educational besides being a problem for the psychiatrists. The educationists argue, not without reason, that the difficult child is primarily an educational problem. It starts with the child's failure to learn, and this failure, it is argued, does not always or necessarily indicate mental instability. Consequently it is claimed that the non-medical educational psychologist is the best-qualified person to examine the child in the first instance. It is also argued that the educational psychologist, having had experience of teaching, is better able than the psychiatrist to appreciate the difficulties of the teacher-pupil relationship and still more perhaps the difficulties of the teacher-parent relationship. These arguments are formidable, in view of the popular prejudice against psychiatrists. The result is that the claim of the local education authorities to provide and control child-guidance centres cannot be contested with any hope of success. This means that there will be a twofold organisation—the child-guidance centre under the education authority, and the child-psychiatric clinic under the health authority—to which the child-guidance centre will refer children exhibiting prima-facie signs of mental instability. There must be some effective liaison between the two, and the simplest way to secure this may be to arrange for the psychiatrist to visit child-guidance centres either by invitation or at regular intervals.

THE CENTRAL DEPARTMENT

This survey would be incomplete without some reference to the functions of the central department. Whether that department is the Ministry of Health or the Board of Control is for this purpose immaterial. In either case the functions and their rationale are fundamentally the same. Some take the view that under present conditions visitation is unnecessary. Such a contention will not stand serious examination. I regard as negligible the risk of illegal detention in public mental hospitals of persons who are no longer proper to be detained, but the case for continuing visitation does not rest solely or mainly on the risk of improper detention. It is justified and necessary on legal, administrative, and medical grounds. On *legal* grounds there is the natural demand that any encroachment on the liberty of the subject shall be safeguarded, whether in practice such safeguards have been proved to be necessary or not. On the *administrative* side there is the principle, which cannot be contested, that the taxpayer and the ratepayer are entitled to be satisfied that money spent on any public service is properly expended. Every type of public hospital must submit to inspection. But apart from these considerations visitation and inspection are valuable on purely *medical* grounds. Statutory visits are the only effective means at present available of pooling experience. I have already referred to the isolation of many mental hospitals. Without the visits of commissioners they would have little opportunity of knowing what new methods had been tried elsewhere and with what results. Nor is the commissioners' experience limited to strictly scientific subjects. There are many administrative problems in the solution of which the wise superintendent will be glad to know what has been tried elsewhere outside his own immediate neighbourhood.

That the Government must maintain some control over capital expenditure by local authorities is almost axiomatic. But, apart from the necessity for some measure of financial control, there is an overwhelming case for the approval of plans by the central department, which knows what has been tried and what has succeeded or failed elsewhere. It is in fact another aspect of the advantage of pooling experience.

THE FUTURE

However disturbing the coming changes may be for the moment, I am convinced that there is a great future for psychiatry. In the past you have had to struggle against much misunderstanding and prejudice, fantasies of illegal detention, silly jests, and, perhaps worst of all, public indifference and professional pessimism. But today a new spirit is stirring. New methods of treatment have given us fresh hopes. When I look back to 1928, when I first went to the Board of Control, I am struck by the change of attitude. Everywhere men are ready and eager to try new methods; their outlook is notably keener and more scientific. There never was a time when the public was so psychologically minded, never a time when the medical profession was so ready to recognise the part which the mind plays in what used to be regarded as purely physical illness. Psychiatry in the future will have a great rôle, in coöperation with general medicine. But if we are to realise our hopes, it is essential to attract into psychiatry a fair share of the best brains in medicine; and this cannot be done unless the young men entering the service now can be assured of adequate remuneration and conditions of employment comparing favourably with other branches of medicine.

". . . The physician of today is twice as well equipped in the war with disease as he was when I was a student. And the physician who knows what is wrong with the patient and has an effective remedy in his hands can cut the cackle. He has no need of it. The doctor's patter has been the subject of ridicule from Molière to Bernard Shaw, but the profession has been weaned from this patter because it has been armed."
—Lord MORAN, P.R.C.P., at the Harveian dinner of the Royal College of Physicians, 1945.

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TISSUE DAMAGE DUE TO COLD

LEIV KREYBERG, M.D.

MAJOR, ROYAL NORWEGIAN MEDICAL CORPS; PROFESSOR OF PATHOLOGY IN THE UNIVERSITY OF OSLO

THIS paper is an attempt to summarise and discuss some of the effects of exposure to low temperature, with special regard to the development of necrosis in frost-bite and trench foot. I have limited my remarks to aspects of the problem with which I have had some personal experience.

DEFINITIONS

One of the main obstacles to a clear conception of the effects of cold is a lack of uniformity in definitions, together with the great variation of designations for the same condition; so I begin by defining the terms which I use.

Minute Vessels.—This term is used, as it is by Sir Thomas Lewis, to designate the terminal loop of the vessels, where the exchange of fluid and metabolic products takes place. They operate as minute "organs" with an arterial, an intermediate, and a venous branch.

Transudation means the oozing of fluid from the minute vessels into the tissue spaces, regardless of the composition of the fluid. Transudation includes simple filtration besides the oozing of a fluid rich in protein.

Increased permeability designates a change in the wall of the minute vessels leading to the passage of more fluid and larger molecules than normal. Experimentally it can be demonstrated by vital stains, "grading of permeability" (Peyton Rous).

Hyperæmia means an increased amount of blood in the minute vessels. In the skin it is followed by a heightened colour, whether venous blue or arterial red. It will be qualified as red or blue hyperæmia.

Venous Congestion.—This term will be reserved for the hyperæmia caused by a hindered blood-flow on the venous side.

Reactive hyperæmia means a hyperæmia which develops after a period of arrest of the blood-flow or after venous congestion.

Inflammatory hyperæmia is used in its clinical sense to denote the hyperæmia following tissue damage and connected with œdema, throbbing, and usually pain.

Arrest of the blood-flow means that the blood-stream is brought to a standstill by purely mechanical means.

Stasis is used in its specific sense to denote clogging of the minute vessels with erythrocytes, while the plasma escapes into the tissue spaces. I shall not discuss the question whether this process is the result of a highly increased permeability and highly increased transudation only, or whether there is also a specific change in the red cells, causing them to cohere. Stasis is often accompanied by diapedesis hæmorrhage.

Pre-stasis designates a circulatory condition when further insults to the tissue, even if small, may cause complete stasis.

There is also confusion in the nomenclature of the different stages in the development of the clinical picture of injuries due to cold. It is probably logical to speak of the period of exposure to low temperature, in which the temperature of the tissues is lowered, and the period of return to normal temperature. The latter is subdivided into periods of (1) rising temperature, (2) temperature of the tissues raised above normal, and (3) return to normal temperature, sometimes through a period of labile temperature.

The reactions of the tissues of the body to cold are best known in the skin, owing to the comparative ease of observation. There are constitutional differences and differences caused by the state of nutrition or of the heart and vascular system by previous exposure to cold, or by the temperature of the body as a whole; but these differences are comparatively small.

INITIAL REACTIONS AND PHYSIOLOGICAL ADJUSTMENT

The description given here is based mainly on the review of Sir Thomas Lewis (1941) and the thesis of Kristian Stray (1943).

Most observers agree that the first reaction of the skin to cold is a paling of the skin, caused by contraction of the blood-vessels, including the minute vessels. When the skin temperature sinks to 15–25° C the skin feels cold to the touch and becomes cyanosed, indicating a local deficiency of oxygen. The minute vessels are more or less dilated, whereas the arteries and the arterioles are more or less contracted. Spealman (1944) finds that the least blood-flow in the limbs is at 15–20° C, and Lake (1917) found that in tissue cultures temperatures of 15–20° C gave the lowest survival-rate, explained by the fact that anabolism is inhibited, whereas katabolism is unaffected.

On further lowering of the skin temperature certain colour changes take place. At about 15° C the skin begins to redden until, at 10° C, it is definitely red, indicating a local surplus of oxygen. This seemingly paradoxical development is caused by the lack of consumption of oxygen and a lowered dissociation of oxygen at this temperature. In these blue and red cold stages the sensation of touch and pain is reduced, there is numbness, and movements are clumsy.

When the skin temperature sinks further—i.e., below 10° C—the skin becomes bright pink and painful. When this low skin temperature has lasted for some minutes, the skin temperature may suddenly rise 5–8° C, and the pain disappears. After a further few minutes contraction of blood-vessels sets in again; and, if the exposure lasts, successive waves of contraction and dilatation of the arteries and the arterioles take place, the minute vessels staying more or less dilated all the time, giving the skin its high colour.

That the minute vessels may still be able to contract is seen by the "white reaction" (Stray 1943) at a still lower temperature, a reaction that seems to precede freezing of the tissue to ice, but must not be confused with the whiteness of the frozen tissue caused by the formation of ice crystals.

If at this stage the temperature of the surroundings returns to normal, there may be no further reactions. If the exposure has lasted long enough, later reactions may follow, but by then they will have passed from purely physiological adjustment to cold, through a borderland, into pathological reactions due to tissue damage. In cold countries borderline reactions are very common, and the minor reactions may, by repetition, cause chronic changes in the tissues.

If the exposure to cold is continued, it may or may not lead to freezing of the tissue to ice. From the theoretical and practical points of view it is reasonable to believe that the formation of ice crystals in the tissues is an additional mechanical or physical insult; but this factor is probably of minor importance as regards the end-result.

It is important to know how much of the damage is done primarily by cold, with or without freezing of the tissues, how much of the final damage is caused secondarily by vascular reaction, and whether the necrosis after exposure is direct or secondary or both. Full knowledge on these points is essential to rational treatment.

If the exposure to cold is continued after the period of physiological adjustment and into a period with tissue damage, it may be one of the following types:

(1) The exposure is comparatively short and moderate before the surroundings return to normal temperature.
(2) The exposure leads to freezing of the tissues to ice.
(3) The exposure is protracted and moderate, leading not to freezing but to severe tissue damage.

These three types of exposure are described below not according to the factors of exposure but mainly according to the resulting damage.

RETURN TO NORMAL TEMPERATURE AFTER SHORT EXPOSURE TO MODERATE COLD

If exposure to moderate cold is somewhat prolonged, nothing beyond the reactions already described is seen

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Notes and News

LAND UTILISATION AND HEALTH

In a Chadwick lecture delivered in London on Feb. 19, Dr. A. G. G. Thompson said that in this country large sections of the people, the town-dwellers, have lost that means of health and happiness which contact with the land brings. With the Industrial Revolution the bulk of the population were cut off from the "way of life" that is farming. Large estates kept land cultivation alive in the Victorian era, but these have since been broken up by taxation, and the land since 1920 has been exploited for present wealth. Mineral extraction has grievously damaged our countryside; slag-heaps cover and kill the fertile soil; while gravel-pits take precedence over the best agricultural land, which unhappily is also best for building development. The area of agricultural land is decreasing as towns spread, while the provision of full amenities in small villages is uneconomical. To prevent the drift to the towns regional planning and decentralisation of industry alone will ensure the best use of all our land, and give equal reward to all people. Meantime in the rural areas modern houses are the urgent need.

The present lack of sympathy between the country and townsfolk, said Dr. Thompson, is largely due to the ignorant destruction which the latter perpetrate. This ignorance can only be cured by educating the children. They would gain love and respect for the countryside by spending a school year or two in country schools; youth organisations and youth hostels would help to maintain contact in after life. "We must plan so that the land they will learn to love shall be developed in the national interest"; and a body independent of Government department control should be set up to prevent its misuse.

COAL IN THE SKY

At Doncaster on Feb. 20, Mr. Arnold Marsh, general secretary of the National Smoke Abatement Society, strongly criticised the prevailing waste of fuel. In his search for coal, he said, Mr. Shinwell should look up as well as down. "There is coal in the sky. Every year we pour into the skies of this country sufficient unburned coal, in the form of smoke, to supply every home in London for six months. Over our large towns, in the winter months, the coal in the sky shuts out two-thirds of the available sunlight, making it necessary to consume still more coal for extra electric lighting. A smoke pall only last week sent up coal consumption for electricity generation in the south-east by a hundred tons an hour. . . It would be hard to find another instance of a nation using a vital raw material, not just wastefully, but to the serious injury of its own people. The most urgent problem is to ensure that the wasteful house-heating methods of the past are not given a further lease of life in the new houses. Every builder or local authority who instals an obsolete open fire or range in a new house instead of a modern high-efficiency type is condemning the tenant to higher fuel bills and less comfort, is perpetuating the smoke nuisance and making inevitable a continued wastage of coal. Every thousand new homes equipped with the obsolete appliances will, on a Government estimate, require an extra thousand tons of coal each year."

TWO MORE FILMS ON ANÆSTHESIA

Two films now obtainable from the Central Film Library, complete the "Technique of Anæsthesia" series of eleven films sponsored by Imperial Chemical Industries, Ltd. *Signs and Stages of Anæsthesia* presents by animation the well-known Guedel chart, with illustrations of the real patient cut in at appropriate places. The respiratory guide to the stages and planes are described first, and then the miscellaneous oropharyngeal and eye reflexes are given their place on the chart; finally the effect of premedication on these signs is indicated. The film has been carefully prepared, but on balance it contains too much chart and not enough demonstration, a failing which is made more prominent by the rather dull manner of presentation. A more serious criticism is that a fine opportunity has been missed for improving on this chart, in which, for instance, the time-relationship of inspiration and expiration is misleading to a student whose physiology lectures are still clear in his mind.

Operative Shock outlines the main factors which, occurring preoperatively or on the table, predispose the patient to shock. The prophylactic measures are indicated, where they are not obvious, and then the treatment for the fully developed condition is demonstrated. This film, which will be particularly valuable to surgeons, contains more technical information than is apparent at first viewing; but it is open to criticism as a film, for jerky editing destroys the flow of the presentation and makes it difficult to comprehend.

Both are sound films, available in 16 or 35 mm.; produced by Realist Film Unit.

University of London

Prof. Wilson Smith has been appointed to the chair of bacteriology at University College Hospital medical school. Since 1939 he has been professor of bacteriology in the University of Sheffield.

Dr. Wilson Smith, who is 48 years of age, was educated at Accrington Grammar School. He served with the R.A.M.C. in the war of 1914–18 and afterwards studied medicine at the University of Manchester, graduating in 1923. In 1926 after several years in general practice he took a course in bacteriology, and the following year, having obtained the diploma in bacteriology of the University of Manchester, he was appointed research assistant to the director of the department of experimental pathology and bacteriology at the National Institute for Medical Research. Three years later he joined the scientific staff of the institute, and in 1934 he was promoted to the senior grade of the staff. With C. H. Andrewes and the late Sir Patrick Laidlaw he had the previous year published their discovery of the virus of epidemic influenza. His other published work includes investigations into the nature of viruses and virus diseases, methods of standardisation and assay of antipneumococcus sera, and bacterial contamination of the cerebrospinal fluid. In Sheffield he has been in charge of the public health bacteriological service and has also acted as honorary bacteriologist to the Sheffield Hospitals, and as honorary regional adviser to the Ministry of Health. He was also in charge of the penicillin treatment of Service casualties in Sheffield and was responsible for the distribution and use of penicillin throughout the area. Last year, with Mrs. Smith, he described in our columns the production of sterile and stable penicillinase. Since 1934 he has been a member of the editorial staff of the *British Journal of Experimental Pathology*.

The degree of D.Sc. has been conferred on Dr. N. F. Maclagan.

University College Hospital

Prof. J. Z. Young will deliver the sixteenth Sydney Ringer lecture on Tuesday, March 12, at 4.30 P.M. at the medical school. His subject will be the Effects of Use and Disuse on Nerve and Muscle.

Course for Diploma in Physical Medicine

The British Association of Physical Medicine hope to hold a course of lectures and demonstrations in applied anatomy, physiology, and physics for doctors intending to take part I of the diploma. The course will begin on March 18 and further particulars may be had from the dean of the medical school, Guy's Hospital, London, S.E.1.

London Hospital Prize

The Glanfield Harris prize will be awarded for an essay by a former student of the hospital who has been qualified not more than ten years for an essay on Recent Advances in Anæsthesia. Entries will be received up to Dec. 31, 1947; further particulars may be obtained from the dean.

Medicine in Jerusalem

Prof. Henry Cohen, speaking at Manchester on Feb. 18 to the Friends of the Hebrew University of Jerusalem, said that though its medical centre was already distinguished there was need to set up a full medical faculty. Palestine's doctors had come mainly from Europe, but in the last twelve years this source of recruitment had dried up. A medical faculty in Jerusalem, he affirmed, would give new life to the Jewish tradition in medicine and would benefit the whole Middle East.

Rockefeller Travelling Fellowships

The Medical Research Council announce the resumption of the pre-war arrangement whereby they were enabled to award medical travelling fellowships provided by the Rockefeller Foundation of New York. For the current academic year the council have awarded fellowships to the following:—

Geoffrey Sharman Dawes, M.A., B.Sc., B.M. Oxfd, department of pharmacology, Oxford University.

*John Louis Henderson, M.D. Edin., M.R.C.P.E., first assistant, department of child life and health, Edinburgh University.

*Ronald Stanley Illingworth, M.D. Leeds, M.R.C.P., D.P.H., D.C.H., late officer-in-charge of a medical division (lieut.-colonel, R.A.M.C.).

Richard Mayon Mayon-White, M.B. Lond., M.R.C. physiological laboratory, Armoured Fighting Vehicles School, Lulworth.

William Alexander Law, M.A., M.D. Camb., F.R.C.S., late officer-in-charge of a surgical division (lieut.-colonel, R.A.M.C.).

Nicholas Henry Martin, M.A., B.Sc. Durh., B.M. Oxfd, M.R.C.P., late assistant director of pathology, 21 Army Group and B.A.O.R. (lieut.-colonel, R.A.M.C.).

Robert Lawrence Richards, M.D. Aberd., assistant physician, neurovascular unit, E.M.S. Hospital, Gogarburn, Edinburgh.

* Awarded in 1939.

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Association of Industrial Medical Officers

The association will hold a meeting at the London School of Hygiene on Friday, March 22, at 4.30 P.M., and at the West London Hospital on Saturday, March 23, at 10 A.M.

Shortage of Medicine Bottles

Chemists are increasingly handicapped by shortage of bottles. The Ministry of Health requests the public to take a clean bottle when medicine is required, and to return the bottle when no further medicine is needed.

Coroners' Society Centenary

The Coroners' Society of England and Wales is 100 years old this year. The centenary president is Dr. G. C. Mort, coroner for Liverpool.

London Irish Medical Golfing Society

The society's annual dinner will be held at the Charing Cross Hotel, London, on Thursday, March 7.

American Gift to Middlesex Hospital

The American Ambulance in Great Britain, which is closing, has given £25,000 from its surplus funds to the Middlesex Hospital to endow two single-bed wards. The staff of the American Embassy and other United States citizens will have first claim on these beds.

Return to Practice

The Central Medical War Committee announces that the following have resumed civilian practice :—

Mr. G. J. O. BRIDGEMAN, M.C., F.R.C.S., 6, Devonshire Place, W.1.
Mr. ANTHONY CHARLES, F.R.C.S., 81, Harley Street, W.1.
Mr. J. B. HUTCHISON, F.R.C.S.E., 4, Newton Place, Glasgow, C.3.
Dr. JAMES MARSHALL, 95A, Jermyn Street, St. James's, S.W.1.
Mr. H. T. SIMMONS, F.R.C.S., 17, St. John Street, Manchester, 3.
Dr. ELLIS STUNGO, 33, Harley Street, W.1.

Discover Your Neighbour

A group of settlements in Bethnal Green is running a series of vacation courses under this title for men and women who are training to be doctors, lawyers, teachers, or probation officers. The object of the courses is to provide a general picture of the social field and they will include practical assignments in shops and factories, bringing students into everyday contact with the life of the neighbourhood, with supplementary discussions and tutorials. The next course runs from March 27 to April 17, and further information may be had from the vice-head, Oxford House, Mape Street, Bethnal Green, E.2.

McGill University, Montreal

A department of anæsthesia has lately been set up at this university, under the chairmanship of Dr. Wesley Bourne. Its main aims are to improve the teaching of anæsthesia to undergraduates ; to offer the internes of the hospitals connected with the university increased opportunities for learning anæsthesia ; to give a three-year postgraduate diploma course ; and to join with other departments in promoting clinical and laboratory research in anæsthesia.

Sir ALFRED WEBB-JOHNSON, P.R.C.S., has been appointed chairman of the Army Medical Advisory Board in succession to the late Lord Dawson.

INFECTIOUS DISEASE IN ENGLAND AND WALES

WEEK ENDED FEB. 16

Notifications.—Infectious disease : smallpox, 4 ; scarlet fever, 1303 ; whooping-cough, 1329 ; diphtheria, 489 ; paratyphoid, 0 ; typhoid, 5 ; measles (excluding rubella), 1489 ; pneumonia (primary or influenzal), 1387 ; cerebro-spinal fever, 73 ; poliomyelitis, 9 ; polio-encephalitis, 2 ; encephalitis lethargica, 2 ; dysentery, 255 ; puerperal pyrexia, 147 ; ophthalmia neonatorum, 74. No case of cholera or typhus was notified during the week.

The number of service and civilian sick in the Infectious Hospitals of the London County Council on Feb. 13 was 1079. During the previous week the following cases were admitted : scarlet fever, 53 ; diphtheria, 25 ; measles, 35 ; whooping-cough, 29.

Deaths.—In 126 great towns there were no deaths from enteric fever, 1 (0) from scarlet fever, 2 (0) from measles, 8 (0) from whooping-cough, 5 (0) from diphtheria, 50 (6) from diarrhœa and enteritis under two years, and 220 (34) from influenza.

Birmingham had 13 deaths from influenza, no other great town more than 7.

The number of stillbirths notified during the week was 251 (corresponding to a rate of 32 per thousand total births), including 39 in London.

Medical Diary

MARCH 3 TO 9

Tuesday, 5th

MEDICAL SOCIETY OF LONDON, 11, Chandos Street, W.1
5.30 P.M. Dr. Horace Evans : Nephritis and Hypertension. (Lecture for demobilised.)

CHADWICK LECTURE
4.30 P.M. (University of Sheffield.) Dr. S. A. Henry : Medical Services in Industry.

Wednesday, 6th

ROYAL SOCIETY OF MEDICINE, 1, Wimpole Street, W.1
2.30 P.M. *History of Medicine.* Dr. J. H. Harley Williams : Life and Work of John Elliotson (1791–1868).
8 P.M. *Surgery.* Mr. Mason Brown, Mr. M. Boyd, Prof. J. R. Learmonth, and Prof. F. Albert : Vascular Injuries in War.

MEDICAL SOCIETY OF THE L.C.C.
2.30 P.M. (Bethnal Green Hospital, Cambridge Road, E.2.) Demonstration of cases by staffs of Bethnal Green and Hackney Hospitals.

ROYAL INSTITUTE OF PUBLIC HEALTH AND HYGIENE, 28, Portland Place, W.1
3.30 P.M. Dr. G. Hamilton Hogben : Provision of Nursery Schools.

MEDICO-CHIRURGICAL SOCIETY OF EDINBURGH
8.30 P.M. (7, Drumsheugh Gardens.) Mr. John Bruce, Dr. J. D. S. Cameron, and Dr. G. A. Grant Peterkin : Sequelæ of Tropical Disease.

Thursday, 7th

ROYAL SOCIETY OF MEDICINE
8 P.M. *Neurology and Orthopædics.* Prof. H. J. Seddon and Mr. G. L. Alexander : Spinal Caries with Paraplegia.

ROYAL INSTITUTION OF GREAT BRITAIN, 21, Albemarle Street, W.1
5.15 P.M. Sir Henry Dale, O.M. : Chemical Transmitters of the Effects of Nervous Impulses. (Second of four weekly lectures.)

EDINBURGH POSTGRADUATE LECTURE
4.30 P.M. (Royal Infirmary.) Mr. John Bruce : Forward Surgery in an Eastern Setting.

Friday, 8th

ROYAL SOCIETY OF MEDICINE
5 P.M. *Clinical.* Endocrinology meeting. (Cases at 4 P.M.)

SOCIETY OF PUBLIC ANALYSTS AND OTHER ANALYTICAL CHEMISTS
5.15 P.M. (Burlington House, Piccadilly, W.1.) Mr. J. H. Quastel, D.SC., F.R.S. : Biochemistry of Soil.

Births, Marriages, and Deaths

BIRTHS

BRIGGS.—On Feb. 20, at Nottingham, the wife of Dr. G. O. A. Briggs—a daughter.
CARTER.—On Feb. 18, the wife of Major C. O. Carter, R.A.M.C., of Charmouth—a son.
CULLEN.—On Feb. 15, in London, the wife of Dr. T. H. Cullen—a daughter.
FISON.—On Feb. 19, in London, the wife of Dr. T. N. Fison—a daughter.
GILLESPIE.—On Feb. 22, in London, the wife of Dr. H. W. Gillespie—a daughter.
MCLEAN.—On Feb. 16, the wife of Dr. I. E. D. McLean, of Hampton Hill—a son.
SHAW.—On Feb. 21, at Colchester, the wife of Dr. J. P. Shaw—a son.
SIMMONS.—On Feb. 19, at Andover, the wife of Dr. A. B. Simmons—a daughter.
SMITH.—On Feb. 19, in London, the wife of Major Hugh Smith, M.C., R.A.M.C.—a daughter.

MARRIAGES

ASHELFORD—YEATES.—On Feb. 20, in London, Mackenzie Ashelford to Sybil Yeates, M.R.C.S.
DAY—HAND.—On Feb. 15, at Ansdell, Lytham, Richard Day, surgeon lieut.-commander R.N.V.R., to Geraldine Hand, V.A.D.
LLOYD—PARKER.—On Feb. 14, Thomas Wigram Lloyd, D.M., to Margo Adela Parker.

DEATHS

BARRIS.—On Feb. 23, in London, John Davis Barris, M.B. Camb., F.R.C.S., F.R.C.P., aged 66.
CLAYTON-MITCHELL.—On Feb. 21, at Norwich, Matthew Clayton-Mitchell, F.R.F.P.S.
DAVIDSON.—On Dec. 24, John Stuart Davidson, M.B. Aberd., colonel late R.A.M.C., aged 82.
DURWARD.—On Feb. 19, at Brierly Hill, Charles Walter Durward, M.B. Edin.
ELPHICK.—On Feb. 23, in London, George James Frank Elphick, M.D. Brux., M.R.C.S.
FORSYTH.—On Feb. 17, at Pinderfields Emergency Hospital, Wakefield, William Dall Forsyth, M.B. Edin., aged 49.
FREND.—On Feb. 22, at Lissington, Hurstpierpoint, Eustace Clifford Frend, M.R.C.S., aged 77.
MACDONALD.—On Feb. 20, Sydney Gray MacDonald, M.A., M.B. Camb., F.R.C.S.
PEDDIE.—On Feb. 16, at Croydon, Henry Anderson Peddie, M.B. Edin., formerly of Edinburgh, aged 87.
STEPHENS.—On Feb. 20, Frederick Archer Stephens, D.S.O., L.R.C.P.E., major R.A.M.C., retd., of West Bay, Bridport, aged 74.

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during the exposure. No reaction beyond moderate pain during the exposure indicates tissue damage. Only the experienced will predict whether or not a pathological reaction will develop, mainly basing his opinion on his judgment of the severity of the exposure. People living in cold countries make such observations every year during the winter, advise their youngsters, and take protective measures.

Exposure for several hours to very cold air, or for minutes or hours to cold water, may produce the following reaction after the return of the exposed part to normal surroundings. The exposed part is flushed red with slight pulsation and, for a brief period, raised temperature. The skin is thicker and slightly œdematous, and sometimes there is itching, burning, or moderate pain. The clinical picture corresponds exactly with that of a moderate sunburn or a moderate scald. This is what clinicians call a first-degree frostbite. Slight pigmentation may be the end-result.

If the exposure has been longer or to a lower temperature, there may be blister formation and a generally more severe reaction altogether. This is clinically known as second-degree frostbite, again very similar to corresponding sun and heat reactions.

It must be emphasised that light and heat may add to the effect of exposure to cold. It is well known in Norway that the most severe acute frost injuries happen in late winter, when the temperature is not so low as at midwinter but the sun is returning after the winter darkness, and people unconsciously or deliberately (tanning) expose their skin to the strong light. It is also well known among people who live in cold climates that an exposure to heat (fireside) after returning home from a cold day out of doors is dangerous.

FREEZING TO ICE AND RETURN TO NORMAL TEMPERATURE

The freezing of the tissues to ice may be preceded by a series of the waves of contraction and dilatation described above as the physiological adjustment to cold. It is generally agreed that during the exposure the arteries and the arterioles are contracted, whereas the minute vessels tend to dilate. Immediately before freezing of the tissues the minute vessels probably also contract—"white reaction" of Stray (1943). It is, however, difficult to be sure of this, as the ice crystals formed on the surface and in the skin make precise examination of these vessels impossible. The whiteness due to ice crystals during freezing would be present even if the minute vessels were dilated.

On return to normal environmental temperature thawing sets in; the whiteness of the frozen skin disappears and is closely followed by a rich red colour, which may be bright or, more often, dull. In a couple of minutes a well-marked œdema can be observed, if the thawing takes place in a heated room; œdema develops much more slowly if the thawing is done gently out of doors or in a cold room. The prominent features of the tissues after thawing are hyperæmia and œdema, which may be severe and accompanied by weals and blisters, raised temperature, and necrosis.

In experimental frostbite Kreyberg and Rotnes (1931) demonstrated that freezing of tissues to ice was followed by a severe hyperæmia and a great increase in permeability of the walls of the minute vessels. In some cases the hyperæmia and œdema lasted for some time after thawing and then receded, and the tissue was not grossly damaged. If, however, freezing had been sufficiently severe, a specific change took place in the minute vessels, and stasis developed. By a special technique it was demonstrated that, after the thawing, the minute vessels were open for the passage of blood (injected indian ink filled the blood-vessels) and were functioning, giving off vital stains (lithium-carmine) through a wall showing increased permeability (increased staining). After minutes or hours the permeability had so increased that all the plasma passed through the vessel walls, leaving the blood-cells stranded in the lumen, tightly packed and forming a mechanical obstruction to further blood-flow. The removal of the full thickness of the skin of mice and of rabbits' ears and subsequent fixation in formalin, dehydration, clearing in xylol, and embedding in Canada balsam, permit a clear picture of the increased transudation and the shape of the blood-vessels, if successfully injected. A piece may be taken out of the centre of the preparation and examined by the ordinary histological technique as a control. The areas in which stasis developed later became necrotic, if a new blood-supply was not established.

Lange and Boyd (1944), by using fluorescein, confirmed our findings and added further valuable observations. The stranded blood-cells in the vessels developing stasis will become necrotic pari passu with the surrounding tissue, both of them for the same reason: lack of oxygen. First the erythrocytes in the vessels merge into homogenous eosinophil masses, which later retract and are found as "hyaline thrombi." I suggest that it is an unhappy extension of the meaning of thrombosis to state that the initial cohesion of the erythrocytes in the vessels is a thrombosis. The essential part of the classical thrombus, the blood plasma, is lacking. The plasma has escaped into the tissues. I use the following terms in this series of events: cohesion of the blood-cells in the period of development of stasis; intravascular blood-cell necrosis in the next phase of development; and intravascular hyaline (or eosinophil) masses for the end-result of the degeneration of the blood-cells. This reaction is quite different from the secondary true thrombosis that may develop at a later stage in or around the tissues undergoing necrosis.

The question naturally arises: how much of the necrosis is caused by the direct action of cold, and how much is caused secondarily as a result of the vascular stasis?

Sir Thomas Lewis and others emphasise the mechanical damage done by the ice crystals. Cells, and especially nuclei, are supposed to be "stabbed" by the sharp crystals. However, it is a common experience in cold climates to have parts of the body frozen to ice without wholesale necrosis. The result may be, after thawing, blister formation and superficial loss of tissue or only desquamation. In surgical wards freezing of tissues to a solid mass with ethyl chloride is not followed by necrosis. These facts show that the freezing of tissues to ice is not necessarily a deadly process like heat coagulation. Experimental evidence points in the same direction. It is not the freezing per se which causes the necrosis. The mechanical difference between freezing tissues with carbon-dioxide snow for 1–2 sec. and freezing them for 4–5 sec., leading in both cases to the tissue being frozen solid, is not great enough, as regards formation of ice crystals, to explain a definite difference in the end-results. Kreyberg and Rotnes (1931) have shown, and Lange and Boyd (1944) confirmed, that necrosis follows a vascular deficiency caused by a blocking of the blood-vessels by red cells. Necrosis in the skin of rats is absent after freezing for 30 sec. and takes place after freezing for 60 sec., and after short periods of freezing the vessels are found dilated and open, whereas after 60 sec. of freezing stasis develops. Further experimental work is, however, desirable to solve the problem.

RETURN TO NORMAL TEMPERATURE AFTER LONG EXPOSURE TO MODERATE COLD

Long exposure to moderate cold is the background of trench foot, immersion foot, lifeboat foot, and similar conditions. The development of these conditions has not been observed from hour to hour during exposure; so our conception of their development is based on

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fragmentary information, and our conclusions are drawn from analogy.

It has been shown above that even short periods of exposure to moderate cold may lead to changes going further than the physiological adjustment to low temperature. Frostbite of first and second degrees is a local tissue reaction common to all types of tissue damage and shows all the classical characteristics of acute aseptic inflammation. Again a definition is desirable. By inflammation is meant the combined vascular and cellular local reactions after the introduction of an element foreign to the tissues. Dead and damaged tissues and abnormal metabolic products may act as foreign elements and cause aseptic inflammation, which may in some cases be dominated by the cellular reaction, in others by the vascular. The most complete vascular types of reaction in which, however, the cellular reaction is not completely absent, are the "triple response" and urticarial responses. In tissue damage by cold it is the severe vascular reaction which predominates.

During prolonged cooling two forms of damage proceed pari passu: that due to cooling and that due to lack of oxygen. One of the first symptoms of prolonged cooling is an increased transudation, with formation of œdema. This increased oozing of fluid is further augmented when the person involved is standing or immobilised (increased hydrostatic pressure); when the limb is constricted (venous congestion); or when the individual is in a poor physical condition (hunger, reduced protein and reduced colloid pressure) or suffering from cardiac or vascular disease. Soon a vicious circle is established, with increasing local tissue damage and increased permeability of the minute vessels. The cold prevents, however, a too rapid development, partly by slowing down all activities and partly by the prolonged contraction of the arteries and arterioles. Accordingly, the foot presented at admission is whitish, bluish, and œdematous, with little or no pulsation in the larger arteries. The local œdema and the spasm of the arteries are dominant clinical features. The minute vessels may again mainly show dilatation (blue) partly obscured by the severe œdema.

When the patient is brought under treatment in a room with a higher temperature, the first clinical reaction from the foot is a re-establishment of the arterial blood-flow. The spasm goes, the heat returns, and the skin becomes more or less deep red. The reaction is probably twofold: a reactive hyperæmia in its specific sense, and an inflammatory hyperæmia caused by the tissue damage.

Again it is important to point out that, unless the case is of long standing, the tissues in the foot are not dead, when the patient is brought under treatment. In trench foot it is still more evident than after freezing to ice that the necrosis of the tissues takes a considerable time and is by no means inevitable, and that incorrect treatment may encourage necrosis. Leriche touches the point clearly in his statement: "Cliniquement, le gelure grave n'est pas une maladie de vasoconstriction, si vouz me permettez ce paradoxe, mais une maladie de vasodilatation." Ungley and Blackwood (1942) state that "Parts which are to become gangrenous blister extensively"; and blistering at physiological temperatures is a vital process. It is a fulminating vascular reaction, which precedes the tissue necrosis; and the mechanism is probably not through pressure of an œdematous fluid, not through a thrombosis in its usual term, but rather through the development of stasis. This would be a good subject for experimental investigation.

ÆTIOLOGY

The view presented here is that the reaction to severe or prolonged cold is due to a single factor: acute aseptic inflammation from tissue damage caused by the lowered temperature, the freezing to ice, and the deprivation of oxygen. The special characters of the inflammation after exposure to cold are the acute onset and the prominent vascular reaction. The respective end-results of exposures, with and without freezing to ice, differ only in degree, not in principle.

The inflammatory reaction to freezing is sharply limited. It shows that the main vascular reaction is strictly local and limited to the minute vessels, and that the metabolic products involved in this reaction are very little diffusible. The type of response and the type of necrosis show great similarity to the corresponding response to exposure to ultraviolet light (Levy 1929). The reaction to light has, however, a longer latent period.

TREATMENT

The practical consequence of this view for the treatment of injuries to cold is to place frostbite, freezing, and trench foot and allied conditions on the same basis. The tissues must necessarily be brought back to normal temperature and normal circulation; but the process of return to normal conditions involves the danger of the development of stasis. If the exposure has been prolonged, very severe, or both, the development of stasis may be nearly instantaneous and unavoidable, and no treatment whatsoever can be of any use. When medical assistance is of importance is when the tissue is in the stage of "pre-stasis." It is then of value to prevent a wrong treatment which may precipitate full stasis and to prevent a condition of pre-stasis from proceeding spontaneously to stasis. In the latter case medical intervention retards or hinders an ordinary tissue reaction.

Empirical experience has already established the principles of such treatment:

1. Avoid rapid heating and avoid rubbing.
2. Place the limb in an elevated position and observe carefully the vascular reaction. If the vascular response is rapid and fulminating, with raised temperature of the skin, the limb should be moderately cooled but not returned to an injurious low temperature with ice-packs or similar treatment. Learmonth and Ungley (1943) have proposed a very simple and logical treatment, according to the principles accepted in this review: "to nurse these patients on their face, with feet and legs uncovered and elevated, by an open window in default of a fan."
3. Keep the skin aired and dry to avoid maceration of the epidermis. A macerated tissue is more easily penetrated by bacteria from the surface.

SUMMARY

The changes which take place in the tissues during progressive exposure to cold and during subsequent warming are described.

The initial changes are a purely physiological adjustment to cold, and it is not until exposure to cold has lasted some considerable time that the reaction of the tissues becomes pathological.

Three types of pathological reaction are described: (1) after a short exposure to moderate cold; (2) after freezing to ice and return to normal temperature; and (3) after prolonged exposure to moderate cold not involving freezing to ice (trench foot, &c.).

The underlying cause of all types of pathological reaction to cold is an acute aseptic inflammation.

Treatment is outlined.

REFERENCES

Kreyberg, L., Rotnes, P. (1931) *C.R. Soc. Biol. Paris*, **106**, 895.
Lake, N. C. (1917) *Lancet*, ii, 557.
Lange, K., Boyd, L. J. (1944) *Arch. intern. Med.* 74, 175.
Learmonth, J. R., Ungley, C. C. (1943) *Proc. R. Soc. Med.* **36**, 515.
Levy, A. G. (1929) *J. Path. Bact.* **32**, 387.
Lewis, T. (1941) *Brit. med. J.* ii, 795, 837, 869.
Spealman, C. R. (1944) United States Naval Medical Research Institute, report no. 1.
Stray, K. (1943) Reaction of the Skin to Cold, *Publ. Norwegian Acad. Sci.* no. 3.
Ungley, C. C., Blackwood, W. (1942) *Lancet*, ii, 447.

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SPRAIN FRACTURE OF THE CARPAL SCAPHOID IN CHILDREN

K. I. MACROSSON
M.B. Glasg., F.R.C.S.E.
SURGEON TO OUTPATIENTS, ROYAL HOSPITAL FOR SICK CHILDREN, GLASGOW; ASSISTANT, DEPARTMENT OF ANATOMY, UNIVERSITY OF GLASGOW

SEVERAL varieties of sprain fracture of the carpal bones have been described. These for the most part occur after forcible palmar flexion of the wrist, when extreme tension on the dorsal radiocarpal ligament may tear a fragment from the cuneiform (Ellis 1942), or the taut ulnar collateral ligament may be ruptured or pull a flake of bone from the cuneiform (Greening 1942). Fairbank (1942), however, has suggested that strong dorsiflexion, with ulnar deviation of the wrist, is a more common cause of chip fracture of the cuneiform, since in this position the cuneiform is pushed against the lower end of the ulna. He admits, nevertheless, that a chip can be torn off through tension on the ulnar collateral ligament, and that this is the more serious injury. More recently Harris (1944) has pointed out that flake fractures of the cuneiform and os magnum may be missed on radiography and are probably more common than is realised.

CASE-RECORDS

The following cases, seen in children, are examples of another variety of sprain fracture of the wrist.

CASE 1.—A boy, aged 12 years, fell on his outstretched hand but could not describe into what position his hand was forced. There was slight swelling in the anatomical snuff-box, but

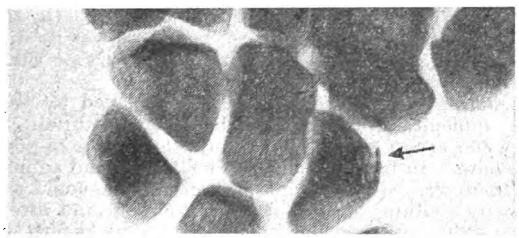

Fig. 1—Radiogram in case 1, showing partial separation of flake of bone from lateral aspect of scaphoid.

maximal tenderness was over the tubercle of the scaphoid. Radiography showed partial separation of a flake of bone from the lateral aspect of the scaphoid near the tuberosity (fig. 1). No special treatment was undertaken, and in 3 weeks the wrist appeared normal on clinical examination. A further plate taken a year later showed no decalcification nor evidence of the former damage.

CASE 2.—A boy, aged 11½ years, fell on the dorsum of his hand and was sure that his hand was forced into ulnar deviation besides palmar flexion. There was pain at the wrist on grasping. Tenderness was present over the tuberosity of the scaphoid, but there was none in the anatomical snuff-box or over the radial styloid. Although not so definitely as in case 1, radiography showed damage to the scaphoid at the attachment of the radial collateral ligament. Treatment by rest in a sling for 2 weeks was ineffective, but complete recovery followed fixation of wrist and forearm in plaster for 4 weeks.

CASE 3.—A boy, aged 12 years, while keeping goal attempted to save a shot and had his wrist violently dorsiflexed when the ball struck his palm and fingers. He demonstrated that his hand was forced into ulnar deviation also. At the time, pain was intense at the front of the wrist. Maximal tenderness was over the tuberosity of the scaphoid, and again radiography showed damage at the attachment of the radial collateral ligament. No special treatment was undertaken; and, although his wrist recovered its function, there still remained, 9 months later, some tenderness on very firm pressure over the tuberosity of the scaphoid. Plaster fixation will be required to abolish this.

DISCUSSION

The radial collateral ligament of the wrist-joint (fig. 2) extends from the styloid process of the radius obliquely forwards and medially to a depression on the lateral border of the scaphoid between the radial articular surface and the tuberosity of the scaphoid, which tuberosity is felt where the tendon of the flexor carpi radialis muscle meets the distal transverse crease at the wrist.

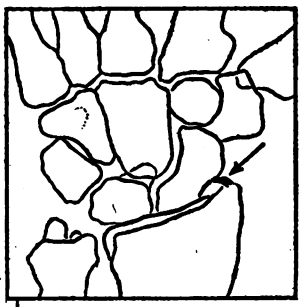

Fig. 2—Wrist in mid position, showing radial collateral ligament relaxed.

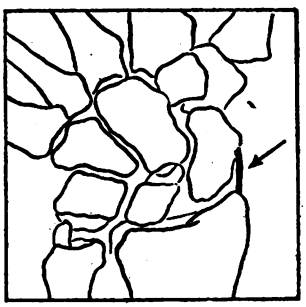

Fig. 3—Wrist in ulnar deviation, showing radial collateral ligament stretched.

Pressure applied to a point immediately proximal to this is over the attachment of the radial collateral ligament. The area of the scaphoid which appears in the floor of the anatomical snuff-box is the lateral part of the dorsum and some of its radial articular surface, the extent of which varies with the position of the wrist. Until the age of 16 years the scaphoid is largely cartilaginous (Todd 1921), and therefore the fixation of the radial collateral ligament to the scaphoid is less secure than its attachment to the radial styloid. In ulnar deviation, which is a much freer movement than radial deviation, there is considerable excursion of the proximal row of carpal bones to the radial side (fig. 3); this tightens the radial collateral ligament (MacConaill 1941). In forcible ulnar deviation this ligament may be damaged or it may pull off a piece of bone from the scaphoid. Lesser degrees of bony damage may occur, and a discrete flake is not always visible on radiography. There is no direct strain on the tuberosity of the scaphoid, and therefore Todd's statement that sudden extreme tension on the external radioscaphoid ligament (radial collateral ligament) may avulse the tuberosity is difficult to understand.

It is suggested that there is a similarity between this type of fracture of the scaphoid and a flake fracture of the cuneiform. Both result from forced palmar flexion or dorsiflexion of the wrist—with radial deviation the cuneiform is liable to damage, with ulnar deviation the scaphoid is involved. The persistence of symptoms in a "minor" wrist strain should direct suspicion to the possibility of sprain fracture, which may be confirmed by radiography. In spite of trivial bone damage, or even in its apparent absence, fixation in plaster may be necessary to overcome disability.

SUMMARY

Sprain or flake fracture may occur in children at the attachment of the radial collateral ligament of the wrist-joint to the scaphoid.

The violence is forcible ulnar deviation of the hand, accompanied by palmar flexion or dorsiflexion at the wrist.

The maximal point of tenderness is in front over the tuberosity of the scaphoid in what appears to be a "minor" wrist strain.

Radiography may show partial separation of a discrete flake of bone or evidence of lesser degrees of damage to the scaphoid at the attachment of the radial collateral ligament.

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Fixation in plaster is necessary if symptoms persist beyond a week or so.

I wish to thank Dr. G. M. Wyburn, of the Department of Anatomy, University of Glasgow, for his advice and criticism, and Dr. D. Campbell Suttie, radiologist, Royal Hospital for Sick Children, Glasgow, for radiograms and for drawing attention to an unusual injury of the scaphoid.

REFERENCES

Ellis, V. H. (1942) *Proc. R. Soc. Med.* **35**, 710.
Fairbank, T. J. (1942) *Brit. med. J.* ii, 310.
Greening, W. P. (1942) *Ibid*, i, 221.
Harris, H. A. (1944) *Ibid*, ii, 381.
MacConaill, M. A. (1941) *J. Anat.* **75**, 166.
Todd, A. H. (1921) *Brit. J. Surg.* **9**, 7.

ACUTE THYROTOXIC MYOPATHY

RECOVERY AFTER PARTIAL THYROIDECTOMY

J. H. SHELDON
M.D. Lond., F.R.C.P.
PHYSICIAN

R. MILNES WALKER
M.S. Lond., F.R.C.S.
SURGEON

ROYAL HOSPITAL, WOLVERHAMPTON

THIS report is prompted by the statement made by Laurent [1] that no patient with acute thyrotoxic myopathy has survived a partial thyroidectomy. The case described is that of a woman who developed simultaneously hyperthyroidism and profound muscular weakness which responded to 'Prostigmin.' The case was acute, for the patient was practically moribund in three months from the onset.

A farmer's wife, aged 50, was first seen in consultation with Dr. Russell Marshall, of Oswestry, on March 4, 1944. She had been well until about Christmas, 1943, when the present illness began. She sought advice in January, 1944, for nervousness, general malaise, weakness, and loss of weight. Signs of hyperthyroidism were present: tremor of fingers, tachycardia, palpable enlargement of the thyroid gland, and slight exophthalmos. She was treated with tinct. iod. mitis min. 3–5 t.d.s. but did not improve.

The physical findings at consultation on March 4 can conveniently be divided into three groups:

(1) *Hyperthyroidism.*—Weight 8 st., against a little over 10 st. at the beginning of the year. Thyroid gland moderately enlarged; tremor of the hands; slight exophthalmos, with a positive von Graefe's sign; regular tachycardia (124 per min.). Heart's action very forcible, with an apical systolic murmur. Blood-pressure 170/90 mm. Hg. Skin warm and moist. Emotional behaviour under examination typical of hyperthyroidism.

(2) *Muscular weakness.*—She had great difficulty in dressing and undressing and could not sit up on the couch, having to support herself with her arms. Speech was affected; after talking for a short while the words tended to run together and become unintelligible.

(3) *Cough.*—She had a distressing cough, and her muscular weakness prevented normal expectoration. The cough had arisen soon after the onset of the illness, and towards the end of February Dr. Marshall had found moist sounds in the right upper lobe. At consultation the rest of the lungs were normal, but over the right upper lobe moist sounds of all kinds were evident to such an extent that it seemed possible that her profound weakness might be due to a combination of pulmonary tuberculosis and hyperthyroidism, and arrangements were made to admit her to hospital. This was not possible until March 20.

During the interval her condition had deteriorated greatly, and mental symptoms had appeared. Dr. Marshall wrote: "I should warn you that her mental condition wants watching; two or three times lately—always in the middle of the night—she has got quite muddled and either tried to walk through the window, insisting it was the door, or tried to climb over the banisters; once or twice she has had an attack of uncontrollable diarrhœa. She is very difficult with her food, won't drink anything hot, and prefers cold water (or beer) to anything else."

On admission she was confused, resented interference of any kind, and watched the movements of the nursing staff with suspicion. The evidence of hyperthyroidism was unchanged, but the muscular weakness was much greater. She could not sit up without support and had difficulty in supporting her head and in swallowing. Weakness and cough prevented an estimation of basal metabolism. The cough had become more troublesome, and sputum was always rattling in her throat owing to her ineffective powers of cough. The cough, which persisted throughout, ultimately proved to be due to a right basal bronchiectasis, though in the early stages physical signs were limited to the right upper lobe. Repeated examinations of sputum were negative for tubercle bacilli, and radiography showed only enlargement of the right tracheobronchial glands and increased density of the right base. The initial lesion was most likely a bronchial catarrh of the right upper lobe, due perhaps to pressure on the bronchus from the glands seen on radiography, and the subsequent development of a basal bronchiectasis was probably due to obstruction of the lower-lobe bronchus with mucus as a result of her inadequate coughing. Later, when she was strong enough to manage postural drainage, her chest condition was easy to control, but at first it caused great difficulty in both diagnosis and treatment.

After admission on March 20 her condition rapidly deteriorated in all respects. Mentally she remained confused and resentful of interference, and feeding was extremely difficult, since apart from the difficulty in swallowing she showed extreme repugnance to food and drink. There were times, usually at night, when she was irrational, and she passed most of the daytime in a semi-comatose state. On the 27th she had incontinence of urine for the first time, and by the 29th she was completely incontinent of both urine and fæces. Her weakness increased rapidly. From being unable to sit up in bed she became unable to lift her arms off the bed-clothes. Owing to her cough she had to be nursed as upright as possible, and in this position she was unable to support her head, which rolled off to one side or the other of the pillow. There was distinct palatal weakness, with nasal regurgitation on swallowing, and speech was badly sustained, becoming nasal and unintelligible after a few words. All deep reflexes were lost. By the 30th her condition was critical, with profound general weakness, ineffective cough, incontinence of urine and fæces, mental confusion, and pulse-rate 150 per min. On this day ptosis appeared for the first time, but there was no diplopia. Bulbar signs therefore became prominent only at the height of her illness.

Treatment with prostigmin had been delayed by the diagnostic difficulties presented by her lung condition, but on March 30 she was given 1 mg. by injection. The response was immediate. In half an hour her swallowing had so improved that there was no nasal regurgitation and she could talk and cough up sputum, lift her arms off the bed, and attempt to sit up. She was then put on prostigmin by mouth, 15 mg. four times a day, with dramatic improvement. Apart from the immediate effect on her weakness, there were equally striking effects on her incontinence and mentality. Both fæcal and urinary incontinence continued for 24 hours and then ceased abruptly, never to return.

On March 31, for the first time since admission, she was rational all day; and, although she had occasional periods of restlessness, her mental confusion then disappeared for good, she was no longer resentful of interference, and she began to take food and drink. The gain in strength continued, so that she was shortly able to sit up in bed and feed herself and by mid-April could start postural drainage. She had occasional attacks of diarrhœa, during which the dose of prostigmin was reduced because it was thought that they were due to the drug; but more probably they were due to the thyroid condition and similar to those she had had before admission. To make sure of its effect, the prostigmin was deliberately left off on April 26 and 27. The result was immediate, the weakness at once returning and showing the characters previously noted. Prostigmin was then started again.

In spite of the immense improvement in her strength and general condition, her hyperthyroidism remained unchanged; and, although she was now eating well, she was steadily losing weight. Obviously the prostigmin had only given us a breathing-space; and, if nothing else was done, either the hyperthyroidism or her pulmonary condition would kill her. In spite of the statement [1] that no-one with this condition had yet survived operation, it was agreed after much discussion that her best hope of survival lay in a partial thyroidectomy. In preparation for this, postural drainage was given as vigorously as possible, she was again given iodine, and the dose of prostigmin was increased to 90 mg. daily.

After a fortnight of this treatment she was still coughing up 3–4 oz. of pus a day; but she appeared to be in as good

1. Laurent, L. P. E. *Lancet*, 1944, i, 87.

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condition as she was ever likely to be, so operation was arried out on May 16 under local anæsthesia with 0·5% ocaine. The thyroid gland was moderately enlarged, m, and of even consistence throughout. The isthmus nd the major portion of both lateral lobes were removed; xamination of the upper opening of the thorax revealed no emonstrable evidence of enlargement of the thymus. During he operation pauses were necessary so that the patient could ough and clear her respiratory passages of secretions. Histo-gical examination of the gland showed an inactive epithelium ith much colloid, evidently the result of the large amount iodine she had taken during the year.

She stood the operation surprisingly well, though for some ays her pulse-rate was 170 per min. and her cough very roublesome. Iodine was continued, prostigmin 90 mg. a ay was given by mouth, postural drainage was maintained, nd after a somewhat stormy 48 hours she began to make rapid eadway and proceeded to an uneventful recovery. On une 1 she sat out of bed for the first time, and on the 9th he was discharged to Oswestry Hospital with orders to take rostigmin 60 mg. a day and to reduce it as much as she ould. This was done under the care of Dr. Marshall, and he made a steady improvement, returning home in August n a dosage of prostigmin 15 mg. a day.

She was again seen in consultation on Aug. 27. Her weight n discharge from Wolverhampton had been 5 st. 1½ lb., ut it had now risen to 7 st. 10 lb. With one 15 mg. tablet f prostigmin in the morning she could dress herself and get bout the house and garden, though slowly. She became ired by the evening, but there was no return of her previous ulbar symptoms affecting speech and swallowing. She was dvised to try giving up the prostigmin altogether.

She was seen again on Oct. 15, when she had had no prostig-nin for 3 weeks, after gradually reducing it to once every 3rd lay. After stopping the drug she had felt more tired on the nd day without the drug than on the 1st, but in spite of this he had given it up altogether. For a week she had felt tired nd her movements were stiff, but after that she managed quite vell. On Oct. 15 she was obviously much fitter and stronger han she had been, and her weight had now risen to 8 st. 5 lb.; she could dress herself, was up and about in the house rom 8 A.M. to 9.30 P.M., and was especially proud of her bility not only to cook a hot dinner but also to make a cake by herself. The lung was distinctly drier than before, and he only had a cough, producing a little purulent sputum, irst thing in the morning. On Jan. 28, 1945, she could still manage without prostigmin and was getting about without symptoms. When she was next seen, on June 6, her weight was steady at 10 st. 5 lb. She had not taken any more prostigmin and had all the time followed her normal occupa-ion as a housewife. She could cycle, and her husband said that her health and strength were the same as before her llness. Seen again in January, 1946, she had now been ifteen months without prostigmin and was leading a normal life. Her weight was 10 st. and basal metabolic rate — 9·9%. Cough had practically ceased, and radiography of the chest showed merely some basal fibrosis.

DISCUSSION

The effect of prostigmin was particularly striking in this case, for within 48 hours of its administration not only had the muscular weakness improved out of all recognition but there was also complete relief of urinary and fæcal incontinence and of mental confusion.

The effect of partial thyroidectomy was totally to relieve her muscle weakness and to obviate the need for prostigmin; this effect was, however, not immediate but developed slowly over the following five months, during which her requirement for prostigmin fell gradually to vanishing-point. Since then she has had fifteen months of good health and strength without prostigmin.

The distribution of the muscular weakness hardly justifies the term "acute thyrotoxic bulbar palsy"; for, although bulbar signs were certainly present (affection of speech, nasal regurgitation of food, and ptosis on one day), weakness of the limb and trunk musculature was clinically more prominent. The case is therefore described under the term "acute thyrotoxic myopathy." The relation of the muscle weakness to that found in myasthenia gravis is obscure; this case responded to prostigmin exactly like one of myasthenia gravis but was cured by thyroidectomy, and no evidence of an enlarged thymus was found at operation. The patient deserves congratulation, for not only does she seem to be the first to have cleared successfully the hurdle of operation but she did so carrying the extra load of a bronchiectasis.

SUMMARY

A woman, aged 50, with acute hyperthyroidism, muscular weakness, and bronchiectasis, was treated at first with iodine but did not improve. This was followed by a course of prostigmin, which greatly improved her muscular power, but her general condition continued to deteriorate. As a last resort, partial thyroidectomy was performed, and treatment with iodine and prostigmin was continued, with the result that the patient soon began to recover rapidly and has remained in good health for fifteen months after gradually leaving off the prostigmin.

We are indebted to Dr. L. P. E. Laurent for a helpful discussion.

POSSIBLE RÔLE OF ANTERIOR PITUITARY IN HUMAN DIABETES

CHARLES H. GRAY
M.B. Lond., M.Sc.
BIOCHEMIST

WILFRID G. OAKLEY
M.D. Camb., F.R.C.P.
ASSISTANT PHYSICIAN, DIABETIC DEPARTMENT

KING'S COLLEGE HOSPITAL, LONDON

IN 1936 de Wesselow and Griffiths claimed that the plasma of elderly obese diabetics decreased the hypoglycæmic action of insulin in the rabbit, whereas plasma from typical young diabetics did not. The similarity of their results in the first type of patient to those of earlier workers who, using extracts of the anterior pituitary, had demonstrated such a glycotropic effect in animals naturally suggested that the pituitary might be the primary causal factor of diabetes in the elderly obese.

Dohan (1938), Himsworth and Kerr (1939), and Marble et al. (1940) were unable to confirm these results; but Dohan used serum instead of plasma, and Marble et al. found glycotropic activity in the plasma of 2 out of 5 insulin-resistant patients. Rushton (1940) found glycotropic activity in the plasma of 6 out of 44 diabetics but could not correlate this activity either with any particular type of diabetic or with total insulin requirement or sensitivity to insulin. Elmer et al. (1937) claimed that the plasma from one case of acromegaly possessed glycotropic activity.

Although the balance of evidence was against the acceptance of the results of de Wesselow and Griffiths as an indication of the presence of a glycotropic substance in the blood of any particular type of diabetic, the number of positive results obtained sporadically by independent workers is too great to be ignored. In the hope of throwing further light on this important subject we have repeated and extended the original experiments by investigating plasma not only from different types of diabetic (especially those resistant to insulin) but also from patients with pituitary disease and dysfunction. Moreover, after the initial experiment with the original technique of de Wesselow and Griffiths, additional quantities of the plasma were injected into the rabbits and, by determining the blood-sugar response to insulin subsequently, glycotropic activity of the plasma could be sought in a manner comparable with the method of Young (1938).

The number of cases we have investigated is too small to enable us to arrive at any definite conclusions; but, in view of the fact that we are unlikely to be able to resume our investigations for some time to come, we feel that a brief account of our results is justified by

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the possibility that they may be of some value to others working on this and allied problems.

EXPERIMENTAL

Young rabbits were used throughout and fed on cabbage, oats, and bran. The plasma was obtained by centrifugalising about 150 ml. of venous blood collected from the patient into a flask containing heparin. Hagedorn and Jensen blood-sugar determinations were done in duplicate on 0·1 ml. samples taken into the zinc-hydroxide suspension straight from the marginal ear vein of the rabbit. A dilute solution of crystalline insulin containing 2 units per ml. was specially prepared by Dr. J. W. Trevan.

A typical experiment was as follows:

Monday 5 P.M.: All food removed from cage.
Tuesday 10 A.M.: Plasma 10 ml. injected subcutaneously.
Tuesday 2 P.M.: Insulin 0·2 unit injected intravenously, the blood-sugar being determined before and 10, 20, 30, 45, 60, 75, and 90 min. after the injection.
Tuesday 4 P.M.: Animal returned to cage and given food.
Tuesday 5 P.M.: Plasma 10 ml. injected subcutaneously.
Wednesday 10 A.M. and 5 P.M.: Plasma 10 ml. injected subcutaneously at each time. Food during whole day, but removed at 5 P.M.
Thursday: Procedure used on Tuesday was carried out exactly; but, when the experiment was to be repeated on the Friday, food was given at 4 P.M. and removed at 5 P.M.
Friday: In many cases the response to insulin was determined again on this day; but usually no injection of plasma preceded this experiment.

Thus it was possible to follow the procedure used by de Wesselow and Griffiths when obtaining the first depression curve and to secure curves after the rabbit had received 50 ml. of plasma during three days. To determine the depression of blood-sugar produced by 0·2 unit of intravenous insulin we performed 21 control experiments on the same rabbits about a week before they were used in the actual experiments.

MATERIAL

Plasma was obtained from 26 patients, who can be divided into 4 groups:

(1) *Mild Elderly Obese Diabetics.*—This group consisted of 5 males and 2 females between the ages of 51 and 77, the average weight being a little over 15 stones. Of these, 2 only required insulin, the remaining 5 being controlled by diet alone.

(2) *Typical Young Diabetics.*—13 patients between the ages of 18 and 48 were included in this group, all but 2 of whom were on insulin.

(3) *Insulin-resistant Diabetics.*—Only 3 cases were investigated, but they were good examples of insulin resistance, their daily requirements being approximately 400, 300, and from 350 to 2000 units daily.

(4) *Cases of Pituitary Disease.*—This group was also very small, consisting of 2 acromegalics with diabetes, one male and one female, and a young girl with pituitary basophilism.

RESULTS

In the following account the term series I curve refers to the insulin-depression curve carried out 3 hours after the injection of 10 ml. of human plasma, series II curve to one carried out after a further 40 ml. of plasma, and series III curve to one carried out 24 hours later still. All depressions of blood-sugar have been expressed as percentages of the fasting level.

Table I shows that there are no significant differences between the average depressions obtained in experiments in the elderly obese group, the young group, or the control group. This was true if the rabbits had received plasma 10 ml. only with the insulin-depression experiment performed 3 hours later, if they had received a further 40 ml. with a second depression curve determined 48 hours after the first, or if the experiment was carried out a third time on the same animal 24 hours later still.

TABLE I—RESULTS (DEPRESSIONS AS % OF FASTING BLOOD-SUGAR)

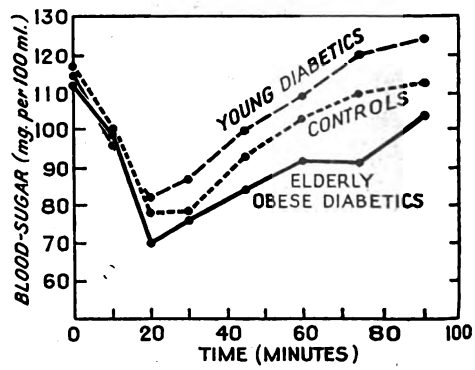
—	Cases	Series I			Series II			Series III		
		Curves	Average	SE	Curves	Average	SE	Curves	Average	SE
Controls	21	..	40 ±12·7 (21–72)	2·8	..	..	..	..	..	..
Elderly obese	7	6	38 ±7·0 (29–48)	3·2	6	29 ±8·0 (20–42)	3·6	5	43 ±12·9 (28–55)	6·5
Young	13	13	31 ±6·4 (20–43)	1·8	11	31 ±7·0 (16–43)	3·2	5	35 ±2·3 (31–38)	1·1

SE = standard error.

Considered individually, in only one case of the elderly obese diabetics did a series I curve give a depression of less than 30. The actual depression was 29, the corresponding series II curve giving a depression of 25. This is considered to be of no significance. In the somewhat larger group of young diabetics five series I curves gave depressions below 30, but no series I curve gave a depression below 20.

Considering all the results, in only one curve of a total of 46 was there a depression less than 20. This was a series II curve in the young diabetic group which gave a depression of only 16, but the significance of this is obscure, since in this case series I and III curves gave depressions of 29 and 34 respectively. Similarly, while 14 curves gave depressions between 20 and 30, these were not confined to any one group of patients or series of curves—i.e., the depression curves carried out on the same rabbit at the other times usually gave depressions above 30.

So that our results may be directly comparable with those published by de Wesselow and Griffiths, the insulin-depression curves after the initial injection of 10 ml. of plasma from the two types of case have been plotted in the form of two mean curves and compared with the control curve similarly constructed (see figure). Because of the questionable significance of such mean curves we have not attempted to construct similar mean curves from series II and series III curves.



Average depression curves.

The results obtained in 3 insulin-resistant diabetics are summarised in table II. Cases 2 and 3 both gave normal depressions in all curves carried out and require no special comment. Case 1 showed low but inconclusive depressions in the first and third curves, but almost no depression at all in the second. The insulin was known to be active and the injection satisfactory, so the result must be considered a true positive. Further plasma from this patient was not available, so repetition of this experiment was impossible.

Many more cases of insulin resistance must be tested before any conclusions can be drawn, but the good depressions in case 2 and, more particularly, case 3, whose daily insulin requirements had at one time exceeded 2000 units per day and were in the region of

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1000 units when the plasma was taken, show that very high degrees of insulin resistance may exist without it being possible by this method of investigation to demonstrate the presence in the patient's plasma of any insulin-inhibiting substance.

The results in two cases of acromegaly and one case of Cushing's syndrome are also summarised in table II. The two cases with acromegaly and diabetes gave good depression figures in the first and second curves, the depression being inconclusively low in the only series III curve. The case with Cushing's syndrome was in a young girl who died shortly after the test and was found to have a small basophil adenoma; there was no evidence of diabetes at any time. These results only show that normal depressions may be found after the injection of plasma from patients with pituitary disease and do not support the view of Elmer et al. that a diabetogenic effect may be demonstrated with blood from such cases.

TABLE II—BLOOD-SUGAR DEPRESSION IN INSULIN-RESISTANT CASES (1–3) AND PITUITARY CASES (4–6)

Case	Condition	Sex	Age	Daily insulin (units)	Blood-sugar depression (as % fasting blood-sugar)		
					Series I curve	Series II curve	Series III curve
1	Ins.-res. diabetes	M	55	360	26	2	22
2	Ins.-res. diabetes	M	57	300	34	29	36
3	Ins.-res. diabetes	F	30	>1000	37	41	..
4	Acromegaly and diabetes	M	34	56	43	34	..
5	Acromegaly and diabetes	F	52	46	40	40	23
6	Cushing's syndrome	F	24	0	52	..	..

SUMMARY

Using the experimental method of de Wesselow and Griffiths we have been unable to find any evidence that the plasma of elderly mild obese diabetics contains a pituitary-like substance which inhibits the hypoglycæmic action of insulin.

The presence of such a substance cannot be demonstrated even when 5 times the volume of plasma used in the original experiments is injected.

Normal depression curves may follow the injection of plasma from highly insulin-resistant diabetics and from cases of acromegaly and Cushing's syndrome.

The incidence of definitely positive results in our series is so low (2 in 60 curves) and so inconstant in any one case that no conclusions can be drawn about their significance.

We wish to thank Dr. R. D. Lawrence for his interest and advice, Dr. J. W. Trevan for kindly supplying us with dilute insulin solution, and Miss M. Sandiford for her valuable assistance.

REFERENCES

de Wesselow, O. L. V., Griffiths, W. J. (1936) *Lancet*, i, 991.
Dohan, F. C. (1938) *Proc. Soc. exp. Biol., N.Y.* 39, 24.
Elmer, A. W., Giedosz, B., Scheps, M. (1937) *Acta. med. scand.* 93, 487.
Himsworth, H. P., Kerr, R. B. (1939) *Clin. Sci.* 4, 119.
Marble, A., Fernald, A. T., Smith, R. M. (1940) *Endocrinology*, 26, 735.
Rushton, J. G. (1940) *Proc. Mayo Clin.* 15, 417.
Young, F. G. (1938) *Biochem. J.* 32, 1521.

THE Royal Sanitary Institute will hold a health congress at Blackpool from June 3 to 7 under the presidency of Lord Woolton. Sir Wilson Jameson will preside over the section of preventive medicine and Prof. S. J. Cowell over the section of food and nutrition. Other sections will include engineering and architecture, maternal and child health, veterinary hygiene, and housing and town planning.

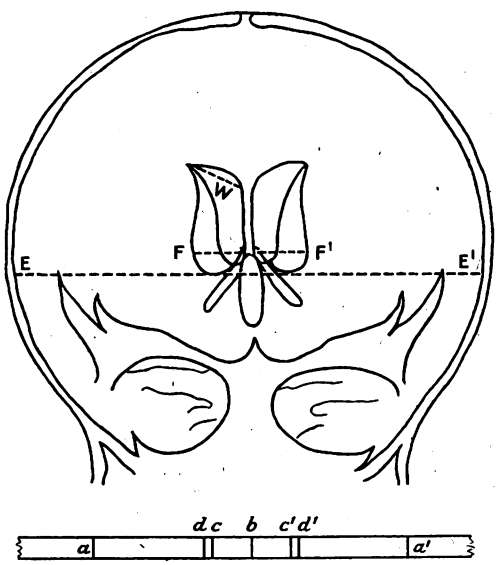
AUTOMATIC DEVICE FOR ASCERTAINING VENTRICULAR ENLARGEMENT

ALEXANDER ORLEY
M.D. Geneva, F.F.R., D.M.R.E.
RADIOLOGIST, WEST END HOSPITAL FOR DISEASES OF THE NERVOUS SYSTEM, LONDON

RADIOLOGY is sometimes called on to decide whether the ventricular system of the brain is enlarged as a whole or in part and if so to define the extent of the enlargement. The problem, particularly in the borderline case, is not always easy to solve, unless a definite standard of ventricular measurements is available, and it is further complicated by variations in the size and shape of the normal ventricles.

Davies and Falconer,[1] in a study of 100 cases of closed head injury, have adopted the diagonal width of the body of the lateral ventricle (W in figure) as "an arbitrary but reliable criterion of the size of the ventricle as a whole." The measurement is made in the standard brow-up projection and normally should not exceed 20 mm. This method should prove particularly useful in cases of unilateral ventricular enlargement. Nevertheless, the choice of the two points delimiting the oblique diameter of the body of the ventricle is somewhat arbitrary.

Evans,[2] on the other hand, insists on the slight variability of the ratio between the transverse diameter of the anterior horns in the standard brow-up projection and the internal transverse diameter of the skull measured on the same film but at a slightly lower (approximately 6 mm.) level (see figure). In a group of 53 normal cases he found the internal transverse diameter of the skull at a 30-inches focus film distance to vary between 12·8 cm. and 16·4 cm., and the transverse diameter of the anterior horns varied between 2·5 cm. and 4·4 cm., with a mean of 3·4 cm. The ratio of the transverse diameter of the anterior horns to the internal transverse diameter of the skull varied from 0·16 to 0·29 : 1, with a mean of 0·23 : 1, the extreme values of the ratio being exceptional.



Above, diagram of anteroposterior encephalogram showing inner transverse diameter of skull E–E' and transverse diameter of anterior horns F–F'; line W represents diagonal width of body of lateral ventricle (slightly modified after W. A. Evans[2]).
Below, diagram to show markings on piece of elastic: *a–a'* marks a length of 10 cm.; *b* is middle line; length between *c* and *c'* measures 2·5 cm. and corresponds to ratio of 0·25 : 1; length between *d* and *d'* measures 3 cm. and corresponds to ratio of 0·3 : 1.

The results analysed in a different way showed that the transverse diameter of the anterior horns varied in proportion to the width of the internal transverse diameter of the skull, the ratio in this analysis varying only

1. Davies, H., Falconer, M. A. *J. Neurol. Psychiat.* 1943, 6, 52.
2. Evans, W. A. jun. *Arch. Neurol. Psychiat.* 1942, 47, 931.

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between 0·23 and 0·24 : 1, the same ratio applying to both children and adults. Evans concludes that normal values of the ratio lie between 0·2 and 0·25 : 1, whereas values between 0·25 and 0·3 : 1 indicate early or questionable ventricular enlargement.

To obviate measurements and calculations the following device is suggested. On a piece of (unstretched) elastic about 6 mm. wide a length of 10 cm. is delimited by two lines *a* and *a'*, each 5 cm. from the middle line *b*, drawn on the elastic (see figure). On either side of this middle line two more pairs of lines are drawn, *c* and *c'*, being 1·25 cm. from the middle line *b*, while *d* and *d'* are 1·5 cm. from *b*. The ratio between *c*–*c'* and *a*–*a'* is thus 0·25 : 1, and the ratio between *d*–*d'* and *a*–*a'* is 0·3 : 1. Stretching of the elastic within reasonable limits does not alter these ratios.

To ascertain whether the ventricles are enlarged or not, the elastic is stretched so as to make the lines *a* and *a'* along the lower edge of the elastic coincide with points E and E', which delimit the internal transverse diameter of the skull. Normally the points F and F', which delimit the transverse diameter of the anterior horns, should come to lie on or inside the lines *c* and *c'* along the upper edge of the elastic, the ratio between the two diameters in such cases not exceeding 0·25 : 1. In cases of early or questionable ventricular enlargement the points F and F' will lie outside the lines *c* and *c'* (along the upper edge of the elastic) but on or inside the lines *d* and *d'*, the ratio in this case not exceeding 0·3 : 1. Obviously the ventricles are definitely enlarged when the points F and F' lie beyond the lines *d* and *d'*.

The same elastic can be used to ascertain a possible lateral displacement of the pineal body. For this, only the lines *a* and *a'* and the middle line *b* are relevant.

CAVERNOUS-SINUS THROMBOSIS
TREATED WITH SULPHONAMIDES AND PENICILLIN

D. H. YOUNG
O.B.E., M.D. Ont., F.R.C.S.E.

DISCUSSING the chemotherapy of cavernous-sinus thrombosis a year ago, a leading article in THE LANCET [1] said that "full doses of a sulphonamide and penicillin would seem the most promising combination." The case reported by Johnstone [2] was first treated with sulphathiazole for six days; subsequently the patient received penicillin at irregular intervals for four days, and, after an interval of eleven days, for another three days. The case to be described was given sulphanilamide (9 g.) and sulphathiazole (24 g.) in small doses at regular intervals over five days. At the same time penicillin was exhibited at a known blood-level continuously for six days. Four methods of giving penicillin were used, and the blood-penicillin levels were checked in three of them. No diminution of the penicillin level was detected during the simultaneous exhibition of the sulphonamides.

CASE-RECORD

An officer was admitted on Jan. 1, 1945, from a Belgian hospital, where he had been treated without penicillin for five days for a carbuncle of the nose.

On admission he looked dangerously ill. Temperature 99·8° F, pulse-rate 100, respirations 22 per min. The left side of his nose was swollen to twice its normal size, was cyanosed, and had a septic bleb on the tip. The left eyelids were much swollen, with chemosis of the conjunctiva. The swelling spread over the left cheek to just above the left eyebrow. There was no definite proptosis, but the eye was immobile. He was confused mentally and became delirious later during the night.

Treatment was started with penicillin 100,000 units intramuscularly at 7 P.M., and this was repeated three hours later. At the same time an intramuscular drip was started of 100,000 units of sodium penicillin to be delivered in twenty-four hours. He was also given sulphanilamide: 3 g. at 7 P.M., 2 g. at 11 P.M., and 1 g. four-hourly afterwards. The left eye was bathed with boric lotion four-hourly.

Next morning there was gross œdema of the left side of the face, with proptosis of the left eye. There was paralysis of lateral movement of the eyeball. The condition was a gross extension of an original septic condition of the nose. Although the lesion was mainly unilateral, it was thought that the thrombosis of the angular veins had extended to the cavernous sinus. There was certainly orbital cellulitis. No real papilloedema was present, but there was some œdema of the retina on the nasal side of the left eye and slight proptosis of the eyeball. Sulphathiazole 1 g. four-hourly was substituted for the sulphanilamide, and the penicillin drip was continued.

At 9 A.M. on Jan. 2 a series of eight intramuscular injections of penicillin 20,000 units repeated every 15 min. was begun. Specimens of blood were repeatedly taken for estimation of penicillin levels to find what peak level was reached by this method.

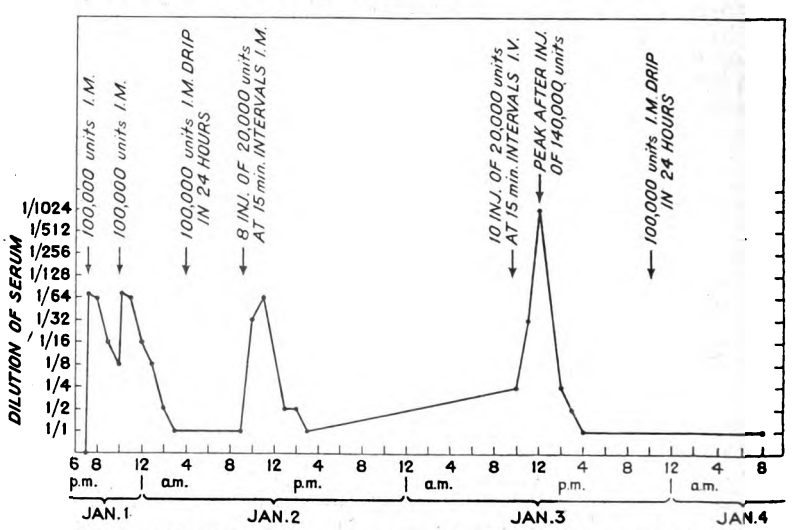
At 10 A.M. on the 3rd a series of ten intravenous injections of penicillin 20,000 units repeated every 15 min. began, and again blood samples were collected for penicillin estimations. The patient's condition was still grave, with some delirium. The swelling had spread a little further over the left cheek and was still very dusky.

On the 4th he was given 3 pints of glucose saline intravenously because he appeared slightly dehydrated. He was still delirious in the morning (and oddly enough was speaking nothing but English, although he was a Belgian).

By 72 hours after admission his mental condition was much more rational, and the swelling on the face appeared less cyanosed. On the 5th there was definite improvement, the swelling was less, pulse slower, and he was coöperating by taking fluids well.

On the 6th the sulphathiazole was stopped, and the penicillin drip was discontinued twenty-four hours later. On the 7th he opened his left eye for the first time by himself. Blood examination showed red cells 4,300,000 per c.mm.; Hb 95%; white cells 22,000 per c.mm. (81% polymorphs).

On the 8th his face had almost regained normal proportions. He still had a slight left-sided headache on the 13th and a slight degree of tachycardia, but convalescence was uneventful till his discharge on the 25th.


100,000 units I.M.
100,000 units I.M.
100,000 units I.M. DRIP IN 24 HOURS
8 INJ. OF 20,000 units AT 15 min. INTERVALS I.M.
10 INJ. OF 20,000 units AT 15 min. INTERVALS I.V.
PEAK AFTER INJ. OF 140,000 units
100,000 units I.M. DRIP IN 24 HOURS
DILUTION OF SERUM
1/1024
1/512
1/256
1/128
1/64
1/32
1/16
1/8
1/4
1/2
1/1
6 8 12 4 8 12 4 8 12 4 8 12 4 8 12 4 8
p.m. a.m. p.m. a.m. p.m. a.m.
JAN. 1 JAN. 2 JAN. 3 JAN. 4

Blood-penicillin levels after intramuscular drip delivering 100,000 units in 24 hours and repeated intramuscular and intravenous injections of 20,000 units. (The levels for single intramuscular injections are average levels charted to give a picture of the therapy used.)

1. *Lancet*, 1945, i, 87.
2. Johnstone, D. F. *Ibid*, 1945, i, 9.

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The blood-penicillin levels obtained and the average responses to penicillin 100,000 units are shown in the figure. All the blood-penicillin estimations were made by Major K. E. A. Hughes, R.A.M.C. The Heatley slide-cell technique, using the standard Oxford staphylococcus as test organism, was used.

COMMENTS

This patient had a penicillin drip of 100,000 units in twenty-four hours running for six days. He also had two injections of 100,000 units on the first day. A course of eight intramuscular injections of 20,000 units every 15 min. raised his blood-penicillin levels to 1 in 64. Next day a course of ten intravenous injections of 20,000 units every 15 min. raised his blood-penicillin level to 1 in 1024. The drip of 100,000 units in twenty-four hours maintained a level of 1 in 1 to 1 in 4 throughout the six-day period. The total amount of penicillin given was 1,160,000 units; total sulphanilamide 9 g.; total sulphathiazole 24 g.

In the opinion of all the specialists consulted, this was a case of threatened or real unilateral cavernous-sinus thrombosis aborted with penicillin in combination with sulphonamides. Whether this was due to the bactericidal effect of the several high blood-penicillin "peaks" which were induced or to that of the constant 1 in 1 blood-penicillin level maintained for six days is a matter for conjecture. In my opinion the safest view is that the continuously maintained bacteriostatic blood-penicillin level is the sheet-anchor of treatment.

SUMMARY

A man with unilateral cavernous-sinus thrombosis secondary to a carbuncle on the nose recovered after receiving sulphonamides and penicillin concurrently.

The combination of sulphonamides and penicillin is strongly advocated for these cases.

Preliminary Communication

ELIMINATION OF GRAM-NEGATIVE BACILLI FROM CULTURES BY TREATMENT WITH ETHER

A SIMPLE technique has been found for the elimination of proteus and other gram-negative bacilli from cultures in which they occur in association with pyogenic cocci. Though it has been tried with only a few different organisms, the results so far obtained are promising.

Many different procedures had been used for suppressing or restraining the growth of proteus, with more or less unsatisfactory results, until it was found that shaking broth cultures of mixed proteus and staphylococci with about 10% of ether killed the proteus after 30 seconds, whereas the cocci survived 3 minutes of the treatment. When, however, a blood-agar plate was soaked in ether for 5 minutes, the ether poured off, and proteus inoculated, the latter grew freely, and it also survived when a drop of broth culture was mixed with a few drops of ether on a plate and then spread.

Further experiments were carried out with 24-hour serum broth cultures of different streptococci, pneumococci, staphylococci, and enterococci, in some cases with proteus superadded. Samples were withdrawn with a pipette, and plates were inoculated at intervals from 15 seconds up to 5 minutes of shaking. In no case did proteus grow, but with some strains of pneumococci and streptococci curious results appeared. Thus, while there was little or no growth perhaps after shaking for 1 minute, a good growth might be obtained from the same culture after 4 minutes. A fresh trial was made with about 2% of ether, but this did not suppress proteus.

It seemed that after shaking two immiscible liquids there might be a tendency for bacteria to be concentrated in the interface between the two liquid layers and to be absent or scanty in other regions of the culture. To overcome this the following technique was devised and is now used.

Material for investigation is inoculated into 3 c.cm. of serum broth and incubated at 37° C in addition to being plated. If proteus is present on the plates next day, about 0·2 c.cm. of the well-mixed serum broth culture is withdrawn with a sterile pipette into a sterile 2 in. × ⅜ in. tube, an equal amount of ether added to this, and the whole intimately mixed by violently filling and emptying the pipette nine times in rapid succession. The whole of the mixture is then quickly taken into the pipette, transferred to a blood-agar plate, and immediately spread uniformly over the whole surface; a second plate is inoculated with a loop from the first to ensure separate colonies. The plates are examined after 24 hours' and if necessary 48 hours' incubation.

The results with cultures of different organisms are as follows:—

RESISTANT TO ETHER	KILLED BY ETHER
Hæmolytic streptococcus (4 strains)	*Proteus vulgaris*
Staph. aureus (2 strains)	*Ps. pyocyanea*
Pneumococcus (2 strains)	*Bact. coli*
Non-hæmolytic streptococcus (2 strains)	Paracolon bacillus
C. diphtheriæ	*Bact. typhosum*
Enterococcus	Shigella of Flexner
	Shigella of Sonne

Control untreated cultures of the susceptible bacteria grew freely. In the resistant group, the growth of the etherised cultures appeared to be as good as in the untreated controls. All the organisms were recently isolated except one strain of *Strep. hæmolyticus* and one strain of *Staph. aureus*.

It is evident that these gram-positive organisms are relatively resistant to ether, whereas the gram-negative are rapidly killed by it. The preliminary experiments showed that the gram-positive organisms tested would withstand 4–6 minutes' treatment; therefore the 20 seconds or so used should give a good margin of safety.

The accompanying table shows the results found with some different samples of pus and two samples of fæces (specimens 14 and 15).

The practical results are that pure cultures of these

RESULTS OBTAINED WITH SAMPLES OF PUS AND TWO SAMPLES OF FÆCES (NOS. 14 AND 15)

No. of specimen	Untreated culture	Etherised culture
1	Proteus and cocci	Hæmolytic streptococci + + +
2	Proteus and cocci	*Staph. albus* + + +
3	*Bact. coli* and *Staph. albus*	*Staph. albus* + + +
4	Proteus and cocci	Non-hæm. strep. + + +, *Staph. albus* +
5	Proteus and cocci	Hæm. strep. + + +, *Staph. albus* +
6	Proteus and cocci	Hæm. strep. + + +, *Staph. aureus* + +, non-hæm. strep. +
7	Proteus and cocci	*Staph. albus* + + +, non-hæm. strep. +
8	Proteus, *Bact. coli*, and cocci	*Strep. viridans* + +
9	Proteus and cocci	Non-hæm. strep. + + +, diphtheroids + + +
10	*Ps. pyocyanea* and cocci	*Strep. viridans* + + +
11	Proteus, *Bact. coli*, and cocci	Non-hæm. strep. + + +, *Staph. aureus* + + +, diphtheroids +
12	*Ps. pyocyanea* and cocci	*Staph. aureus* + + +, non-hæm. strep. +
13	*Ps. pyocyanea*, *Bact. coli*, and cocci	*Staph. aureus* + + +, non-hæm. strep. + + +
14	Coliform bacilli	*Strep. viridans* + + +, *Staph. albus* +, micrococci +
15	Coliform bacilli and cocci	*Strep. viridans* + + +, hæm. strep. +, micrococci +

+, + +, + + + = increasing density of growth

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gram-positive organisms are easily obtained and the testing of their sensitivity to antibacterial agents greatly facilitated. The efficacy of the procedure does not seem to be affected by the numbers of susceptible bacteria present, and its application to the bacteriology of fæces is being investigated further. It is also possible that this method will prove of value in the separation of clostridia, but hitherto there has been no opportunity of testing this.

I am very grateful to Mr. H. J. Young for his interest and technical assistance.

RICHARD PEARCE, M.D. Camb.
Department of Pathology, West London Hospital.

Reviews of Books

The Vitamins in Medicine

(2nd ed.) FRANKLIN BICKNELL, D.M. Oxfd, M.R.C.P.; FREDERICK PRESCOTT, PH.D. Lond., M.R.C.S., clinical research director, Wellcome Research Institution, London. London: Heinemann. Pp. 916. 50*s*.

THE first edition in December, 1942, contained 662 pages and 120 illustrations. This second edition runs to over 900 pages, with 208 illustrations, and there are nearly 4500 references to original papers. These facts indicate both the pace at which the subject is growing and the industry of the authors. The great expansion of knowledge of the vitamin-B_2 complex has led them to rewrite and expand the chapters concerning this complex, and also riboflavine, and they have added a new chapter on the essential nature of some of the unsaturated fatty acids. The general arrangement of the book remains unchanged. Although it deals faithfully with the history, chemistry, and physiology of each vitamin, its approach is still essentially clinical, and many of the illustrations are taken from vitamin deficiencies in man. One of its objects is to provide the general practitioner with a comprehensive statement from which he can easily discover when vitamins are worth a trial and to what extent his observations may be original. The result is an admirable compendium. Some would have preferred to see the references arranged in alphabetical order, and nobody could pretend that *all* the papers mentioned have been critically reviewed; but it is remarkable that any two men should have been able to put together such a collection of observations and conclusions in such a readable form. The publishers are also to be congratulated on their share of the presentation.

To read this book makes one forget that the vitamins play only a small part in general medicine. In ten years' time, will they still be in the limelight, tried for every disease under the sun, or will some other group of substances, such as the amino-acids, have taken their place? Will, for example, sprue continue to occupy such a prominent position in the chapter on riboflavine? No-one can say; but, whatever the importance of the vitamins, it is to be hoped that the present authors will continue to be able to record it.

Der elektrische Unfall

als pathologisch-anatomisches, klinisches, und unfallmedizinisches Problem. FRITZ JENNY, medical officer, Swiss Accident Assurance Company, Lucerne. Berne: Huber. Pp. 144. Sw. fr. 12.50.

IT was under the same title that Stephan Jellinek, pioneer of electropathology, published his first book in 1926. Six years later he produced his classical *Elektrische Verletzungen, Klinik, und Histopathologie.* After that no new edition could be published in Hitler's Germany, and there is therefore room for a new book. No modern monograph on the subject seems to be available in English.

The first chapter of Jenny's work deals with physical laws and properties of electricity and lightning, and the resistance of the human body and its various tissues. As Jellinek pointed out, however, knowledge of the physical properties of the electric current often fails to explain its action on the human body, and animal experiments under controlled conditions are not entirely comparable with accidental injuries. Close attention is paid to the effects of electricity on tissues and organs. The skin lesions at the points where the current enters and leaves the body ("current marks") are of special forensic and pathological importance. Jellinek regarded them as specific for electrical injuries; Jenny's attempt to qualify them as true burns due to heat is based mainly on recent German writings and is not convincing. Nor perhaps do similar quotations justify him in denying the specificity of the muscle spirals described by Jellinek, and the same applies to his remarks on changes in the bones ("osteoschisis"). More easily acceptable are the paragraphs on the effects on the heart and central nervous system. Dr. Jenny's warning to be careful in the attribution of illness to electrical injury is based on wide experience, and his chapters on prevention and treatment are also valuable, though his criticism of Jellinek's views on artificial respiration is itself open to criticism. He provides a very full bibliography.

Early Diagnosis of the Acute Abdomen

(9th ed.) ZACHARY COPE, M.D., M.S. Lond., F.R.C.S., surgeon to St. Mary's Hospital, London. London: Oxford University Press. Pp. 262. 12*s*. 6*d*.

THE only conspicuous difference between this edition and the last is that the book now occupies about half as much lateral space on the shelf, because the paper is thinner. Despite this shrinkage it is some 5 pages larger, having two new X-ray photographs illustrating acute intestinal obstruction, and also a more detailed description of the types of acute obstruction, and a paragraph on ovarian endometrioma. The popularity of this work is well founded, but a chapter on the mechanism and interpretation of abdominal pain would make it even more valuable.

Chirurgie de la main

Part II. MARC ISELIN, surgeon to the American Hospital, Paris. Paris: Masson & Co. Pp. 238. Fr. 140.

THE third edition of this work is published in two parts. The first, styled "livre du practicien," appeared in 1938, and was later translated into English; it covered wounds, infections, and closed injuries. The second, "livre du chirurgien," which deals with the reparative surgery of injured hands, appeared belatedly in 1945.

It could not, however, have come out at a better time (unless during the war); for hand injuries have been exceedingly common in the last six years, and many of the results can still be much improved. Dr. Iselin points out how important it is to study the damaged hand anatomically, to determine whether the lesion is of skin, of bone, of tendon, or of bone and joint; and for each he clearly states the method he has found most useful. It is surprising to see him employ Davis grafts for final repair of a contracted hand: in the case described a flap would have been excellent; though one would hesitate to advise anyone to undertake a pedicled flap operation from the instructions and diagrams given. It is also surprising to read of tannic acid being used for burnt hands. The section on tendon surgery is excellent; one notes the insistence on three weeks' immobilisation. For reconstruction of the thumb Dr. Iselin prefers using the index of the same hand, rather than a transplant. The book closes with a full description of artificial limbs, and not a little detail of kinæsthetic procedures. It is difficult to believe that these complicated operations produce better function than the artificial limbs we know in this country. These differences of technique, however, are to be expected in a book from abroad. There is so much of value in this one that it ought to be translated, so as to be of service to more surgeons here.

A B C of Medical Treatment

E. NOBLE CHAMBERLAIN, M.D., M.SC. Lpool, F.R.C.P., lecturer in medicine, University of Liverpool. London: Oxford University Press. Pp. 206. 10*s*. 6*d*.

THIS booklet has been written for "the general practitioner who wishes to make a quick reference to the essentials of treatment." As such it will be useful, provided emphasis is placed on the word "quick." Attention is of course concentrated on the commoner illnesses encountered in general practice, but it is curious that osteo-arthritis and shingles should be omitted. More than a quarter of the book is devoted to diet sheets constructed by Miss Rose Simmonds with her usual competence.

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THE LANCET

LONDON: SATURDAY, MARCH 9, 1946

A Higher Level for Military Medicine

EIGHTEEN months ago Dr. LOYAL DAVIS, as editor of the influential American journal, *Surgery, Gynecology, and Obstetrics*, made a vigorous attack on the arrangement whereby the surgeon-general of the United States Army was without direct general-staff representation or responsibility.[1] The surgeon-general, so the argument went, could reach the general staff only through the intermediary services of supply; the medical corps of the United States Army was so decentralised that there was an autonomous corps for the Air Force, and an independent corps for each operational theatre; and the surgeon-general's power was so limited that he was no more than an agent for the provision and distribution of supplies and personnel. The surgeon-general was subordinate to non-medical officers of the army and unable to deal directly with chief surgeons in operational theatres until he had gained permission through the line of command; and because he was not fully informed of operational plans he was bound to keep on hand an enormous reserve of inactive doctors and supplies so that he might not be caught short at critical moments. DAVIS went on to contrast this state of affairs with the arrangements in the Red Army, whose surgeon-general was directly responsible to the defence commissariat and the chief of staff of the army. Because of this direct relationship the Soviet surgeon-general was fully aware of the nature, aim, and extent of all impending offensives; and he was in charge of wounded airmen as well as soldiers. In Russia as elsewhere the medical services of an army were, for operational and tactical purposes, subject to the commander-in-chief; but uniform medical and surgical policies were carried out in response to the orders of the head of the medical service. After these editorial criticisms had been brought to the notice of the U.S. secretary for war and the chief of staff,[2] a circular was issued giving the surgeon-general direct access to the chief of staff, but reaffirming that the surgeon-general was under the orders of the commanding general, Army Service Forces; the same circular also charged commanders-in-chief with responsibility for the organisation and conduct of the medical service of their commands, thus taking away with one hand what it appeared to give with the other. The original critic has now made it clear that he is not satisfied.[3]

As we have already insisted,[4] the civilian profession in this country must interest itself in the medical affairs of the Services far more than it has done in the past; for their part, the military doctors will do well to accept help and criticism in the proper spirit, realising that the civilians who have to contribute the vast majority of serving medical officers during a war have a legitimate interest in the administration, policies, and professional standards that are set up during peace. How far, then, we must ask, do these discussions fit the situation here? In our view, the complaints about the status and responsibilities of the surgeon-general of the U.S. Army apply also to the British organisation, in which the director-general of the Army Medical Services finds the adjutant-general between him and the chief of staff and Secretary of State. To take one important point among many, the British organisation was certainly wasteful of medical manpower. In a war, especially when the enemy has the initiative, there must be some doctors in the Forces who are not fully occupied with their ordinary professional duties. But throughout the late war there was disturbing evidence that too many doctors were wasting time and that much of this could have been avoided by better and less rigid planning. Direct medical representation at a higher level would probably have done a great deal to make this possible. In our grave emergency it was reasonable enough to accept things much as they were, for it was better to improvise a working answer than to puzzle out the ideal but difficult solution. But now that we have the chance we must set about removing the departmentalised outlook which made it impossible to move doctors quickly to wherever they were most needed without regard to whether they were claimed by the Navy, Army, Air Force, Emergency Medical Service, or Colonial Service. One advantage to be gained from a National Health Service is a broadening of outlook, making it easier for a doctor to serve those who most need him and to gain experience in more than one field. According to the white-paper of 1944, the medical services of the Fighting Forces lie outside the scope of the proposed legislation; but it is clear that at any rate the Navy, Army, and Air Force must in future (as the PRIME MINISTER said in the Commons on Monday) follow a common doctrine as part of a single Service rather than as rival claimants for the resources of the nation. There are in fact many reasons why the ablest administrators of the three medical services should sit down together, digest the medical lessons of the war, and propose the appropriate measures for their own improvement and coördination as a necessary first step to their seeking representation at a higher level, more effective control of their representatives in the field, and much better facilities for maintenance of professional standards. If the Services are reluctant or unable to take on this task, it should be done for them.

To say this is not in any way to belittle the splendid work that was done by doctors in uniform throughout this war, which was notable for the absence of any breakdown in medical arrangements. In this it differed from all previous wars, and we should recognise the fact with gratitude. But it is also true that many doctors have returned to civilian life with the firm conviction that if their administrators had been able to think in a larger way than they did, the struggle to maintain the highest professional standards would not have been such an uphill affair.

Neonatal Infections

PREMATURITY, asphyxia, birth injury, and congenital deformity together account for more than two-thirds of the deaths in the first few weeks of life, and most of these deaths occur within a week of birth. Reduction of the mortality from these causes (about half of the total neonatal deaths occur in the first day of life) depends mostly on good antenatal care, good obstetrics, and better nutrition of the mother.

1. Davis, L. *Surg. Gynec. Obstet.* 1944, **79**, 329.
2. Moore, J. E. *Ibid*, 1945, **80**, 333.
3. Davis, L. *Ibid*, 1945, **81**, 702. 4. *Lancet*, 1945, ii, 531.

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That this last factor is particularly important is indicated by the remarkable reduction in neonatal mortality and the closely related stillbirth-rate during the war years 1940 to 44—from 29·6 to 24·5 and from 36 to 28 respectively per 1000 live births. Infection, which is relatively unimportant as a cause of death in the first week of life, becomes the major cause in succeeding weeks, when bronchopneumonia and gastro-enteritis are the principal killers. But, besides the fatalities, infection is responsible for a great amount of morbidity, often apparently trivial but liable at any time to lead to more severe illness and death. Such infections should be largely preventable, and increasing attention is now being given to their causation and control.

In his recent Still memorial lecture[1] and at the Royal Society of Medicine on Feb. 20, Dr. ROBERT CRUICKSHANK maintained that infection in the early weeks of life is mostly due to the endogenous bacterial flora, and is aggravated by adverse environment and by the infant's poor physiological and immunological response to infection. Examples of endogenous infection—i.e., with bacteria which become resident on the skin, in the nose and upper respiratory tract, and in the intestine, very early in life—are the frequent staphylococcal infections of skin and conjunctiva, associated with a nasal carrier-rate of 80–100% for *Staphylococcus aureus* in the first few weeks of life; pneumococcal infections due to types which are prevalent (30–60%) in the throat of healthy infants (e.g., types 4, 6, 19, and 23); and monilia infections of the mouth and œsophagus, much less common in breast-fed infants than in the artificially fed, whose mouths often harbour these fungi.[2] The fact that one or a few serological types of these potentially pathogenic but poorly invasive bacteria may be isolated from a series of cases, as has happened with pneumococcus types 6 and 19 in bronchopneumonia of infancy or with type 3 in older people, does not mean that such organisms are to be regarded as "epidemic" strains in the sense that they will overcome the resistance of healthy robust tissues. The spread of these bacteria in a community will be favoured by propinquity and overcrowding, and thus a particular pneumococcus or staphylococcus will be isolated from a series of infected infants, so simulating the spread of an accepted epidemic strain, such as pneumococcus type 1 or 2, which can spread and initiate infection among older, more resistant groups. When this view of the pathogenesis of infection in infancy is applied to intestinal disorders, it at once becomes apparent that the high coliform content in the bowel of the artificially fed infant, compared with its rarity in the intestine of the breast-fed child, is associated with the much greater frequency and severity of diarrhœa in the artificially fed group. Thus, in an outbreak of neonatal diarrhœa in a maternity unit where at the time only 12 of 30 babies were wholly breast-fed, these 12 babies alone escaped infection; the remaining 18 all developed diarrhœa and all died.[3] In another outbreak recorded by ORMISTON,[4] the fatality-rate among the breast-fed infants was 14% and among those artificially fed 60%. Similarly in gastro-enteritis of older infants, only 5–10% of the infection occurs among breast-fed children, and breast-feeding even for a few weeks seems to give the baby an added resistance in overcoming infection.[5]

That some gram-negative coliform organisms may be especially incriminated in the causation of infantile enteritis is suggested by the early work on summer diarrhœa by MORGAN and METCHNIKOFF, both of whom reported a high incidence of proteus types, while SAKULA[3] found *Ps. pyocyanea* unusually common in neonatal diarrhœa, and BRAY[6] reported the recovery of *Bact. neapolitanum* from over 90% of cases of gastro-enteritis in older infants. Obviously, a reliable classification of the coliform group, either serologically or by phage typing, is needed to determine whether specific types have, like certain pneumococcus types, the capacity to spread and to initiate infection when resistance is lowered. Progress towards this end was made by the early work of KAUFFMANN and lately by VAHLNE,[7] who has subdivided the coliform group into some 115 types on the basis of O (somatic), K (capsular), and H (flagellar) antigenic analysis.

Support for the endogenous ætiology of neonatal diarrhœa by potentially pathogenic bacteria comes from veterinarians, who, as Mr. R. LOVELL, PH.D., pointed out at the Royal Society of Medicine discussion, have shown that calf scours and lamb dysentery are associated respectively with coliform bacilli and *Cl. welchii* type B—organisms which have little or no pathogenicity for older animals. And, as with the human infant, adverse environment and poor neonatal care are important contributory factors. Added to that is the poor response which the infant makes to infection. Localisation of infection requires a combination of phagocytic activity and antibody production. The newborn infant, with inadequate material in the shape of low plasma protein, poor plant in the form of an undeveloped lymphatic system, and unskilled workers simulated by immature polymorphonuclear and monocytic cells, is ill adapted to cope with bacterial invasion. Furthermore, its delicately balanced physiology is easily upset. Low gastric acidity plus a foreign protein like cow's milk allows bacterial colonisation of the upper reaches of the gut, with consequent irritative effects and possibly absorption of toxic substances by the liver, which in the diarrhœa of early infancy seems to bear the brunt of infection as instanced by toxic and fatty changes. The excretory system cannot deal adequately with increased waste products, and hence œdema is apt to appear which in turn embarrasses respiration. Anoxæmia is probably a more common complication of illness in early life than is usually realised, and oxygen therapy could be used with advantage more often in dealing with infantile infections.

On the preventive side Dr. BERYL CORNER at the pædiatric section of the society on Feb. 22 gave a detailed report on the incidence and methods of controlling neonatal infection in a busy maternity hospital where infections of all descriptions occurred in 25% of some 3500 babies, only 3 of whom died. The most frequent of these infections were conjunctivitis, skin lesions, and mouth and nose infections, whereas gastro-enteritis was rare, probably because practically every baby was breast-fed. This remarkably low mortality was attributed in large measure to the attitude which doctors and nurses were taught to

1. *Arch. Dis. Childh.* 1945, **20**, 145.
2. Ludlam, G. B., Henderson, J. L. *Lancet*, 1942, i, 64.
3. Sakula, J. *Ibid*, 1943, ii, 758.
4. Ormiston G. *Ibid*, 1941, ii, 588.
5. Gairdner, P. *Arch. Dis. Childh.* 1945, **20**, 22.
6. Bray, J. *J. Path. Bact.* 1945, **57**, 239.
7. Vahlne, G. *Arch. Path. Microbiol. scand.* 1945, suppl. 63.

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adopt towards apparently trivial infections among the infants. All minor lesions, such as sticky eyes or a few septic spots, were reported and treated at once, the lesions where possible being covered and the child put on barrier nursing. Accurate records were kept in a report book of each infant's day-to-day progress, and a separate nursing staff was detailed to look after the nursery. The young nursery probationer proved to be an invaluable handmaiden for the trained nurse. Among other points stressed by Dr. CORNER were the need for gentle handling of the infant, the use of movable baths, fixation of the baby's arms by a wrapper, and avoidance of contact of the skin with blankets.

Throughout these discussions the great superiority of breast over artificial feeding was constantly being brought out, and the time seems ripe for a national campaign to convince both medical men and the laity that a large proportion of the babies who now die in the early months of life could be saved if they were fed on the breast for three to six months.

Lightning Injuries

IN this age of air-raids, rockets, and flying bombs the chances of death or injury by lightning seem very remote; but they still exist. Thunderstorms are rare in high latitudes but are very common near the equator.[1] In Kenya Colony several hot-weather thunderstorms occur daily all the year round; and even in France there are comparatively few days in which thunder is nowhere reported. Indeed, BROOKES[2] has calculated that there are 44,000 thunderstorms on earth a day, and that 1800 are in progress at any one moment, with about 100 flashes of lightning every second.[3] Fortunately, nine-tenths of these flashes never reach the ground, for otherwise the incidence of injuries would be much greater.

The lightning flash is now recognised as a rush of protons and electrons through the air,[4] with the liberation of a great amount of energy along an average path of two kilometres. The current is direct, not alternating, of the order of 1000 million volts and perhaps 20,000 amperes. The duration of a single stroke is about a thousandth of a second. The flash follows meandering channels, with secondary flashes branching off, some of them ending blindly. It often consists of several successive components, as the ionisation of the air along the track provides a succeeding stroke or a return stroke along a ready-made conducting path. The diameter of the channel down which the lightning travels is estimated as at least 18 feet.[4] When it hits the earth, however, objects 100 feet or more apart may all be struck by branching out or breaking up of the lower end of the flash.[5]

Lightning injuries are manifold. Burns, fractures, lacerations, cataracts, and various lesions of the nervous system have been reported in persons who survived the initial shock. JELLINEK in particular has made a careful study of such injuries covering a period of more than forty years. Lightning injuries are more frequent than is usually realised. From 1924 to 1933 there were 3849 deaths due to lightning within the death registration area of the United States,[6] and since 1934 there has been a relative increase. In England and Wales there were 10 deaths from lightning in 1930. The number of deaths is small in proportion to minor injuries; out of 300 persons in a church which was struck, 100 were made unconscious and injured, 30 had to take to bed, and only 6 were killed.[7]

Burns are the most common injuries from lightning. They may produce unusual patterns, such as arborescent markings on the skin and long narrow lines. The force of explosion may cause large lacerations.[8] Metal objects in the pockets or in contact with the body, such as buckets and iron rods, may determine the type and severity of the injury.[9] ASHBY[10] described the unusual case of 3 children who developed left-sided alopecia a fortnight after they were struck by lightning; their hair grew again after six months. The electric lesion, however, is not a true burn; it is painless and without inflammatory reaction. JELLINEK's experiments and microscopic studies make him believe that tissue struck by lightning is in a polarised state and that the cellular pattern is comparable with the pattern of metallic particles in an electromagnetic field[11]; vasoconstriction and vasoparalysis with subsequent thrombosis account for the pathological effects. This view is important in the treatment of these "burns," for which JELLINEK recommends masterly inactivity. Bleeding from the ear followed by unilateral deafness was reported by SILVERMAN.[12] Affections of the eyes include conjunctivitis and accommodation paresis,[13] but cataract is more frequent.[14,15] Effects on the central nervous system have been studied in detail by JELLINEK,[16] PANSE,[17] and CRITCHLEY.[18] They are divided into three groups—(1) immediate, comprising shock, unconsciousness, and "suspended animation" (a term favoured by JELLINEK); (2) secondary, including visual disturbances and temporary nervous disorder; and (3) remote effects including various rare complications.

A person struck by lightning usually falls unconscious at once. Retrograde amnesia is common. As PLINY said, "the man who sees the lightning flash and hears the thunder, is not the one to be struck." Among the secondary effects, flaccid paralysis of the lower trunk and of the legs is the most outstanding, and objective sensory disturbances also occur. The condition is temporary, power and sensation usually returning to normal after 12 hours. The cause of this so-called keraunoparalysis is perhaps a general vasoconstriction, due to autonomic stimulation. Visible signs of these severe vasomotor changes are the blanching or livid discoloration and coldness of the legs. Next in frequency are hysterical manifestations—hysterical deafness, blindness, and loss of

1. Jex-Blake, A. J. *E. Afr. med. J.* 1945, **22**, 170.
2. Brookes, C. E. P. Metereological Office Geophysics Memoir, no. 24, 1925.
3. Schonland, B. F. J. Atmospheric Electricity, London, 1932.
4. Abbott, C. G. *Smithsonian misc. Coll.* 1934, **92**, no. 12.
5. White, A., White, T. H. *E. Afr. med. J.* 1945, **22**, 167.
6. Crawford, A. S., Hoopes, B. F. *Surgery*, 1941, **9**, 80.
7. Editorial, *E. Afr. med. J.* 1945, **22**, 165.
8. Hegner, C. F. *Ann. Surg.* 1917, **65**, 401.
9. Elwell, E. G. *Brit. med. J.* 1934, ii, 771.
10. Ashby, H. T. *Ibid*, 1919, i, 307.
11. Annotation, *Lancet*, 1944, ii, 446.
12. Silverman, N. M. *J. Indiana med. Ass.* 1936, **29**, 530.
13. Lea, J. A. *Brit. J. Ophthal.* 1920, **4**, 417.
14. Du Toit, J. S. *J. med. Ass. S. Afr.* 1927, **1**, 503.
15. Lloyd Williams, I. H. *Brit. med. J.* 1923, ii, 659.
16. Jellinek, S. Elektrische Verletzungen, Leipsig, 1932, *Wien. klin. Wschr.* 1932, **45**, 33.
17. Panse, F. *Mschr. Psychiat. Neurol.* 1925, **59**, 323; *Abhandl. Neurol. Psychiat. Psychol.* 1930, **59**.
18. Critchley, M. *Lancet*, 1934, i, 68.

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speech have been reported; but so has the cure of pre-existing hysteria. Late changes may take a variety of forms. PANSE [17] described what he called "spinal atrophic paralysis," which consists in muscular atrophy with fibrillation, without sensory disturbance, in the distribution of the 4th, 5th, and 6th cervical segments of the cord. DUNCAN LEYS,[19] however, reported a case of spinal atrophic paralysis developing a few weeks after a severe lightning stroke, which was progressive and clinically indistinguishable from progressive muscular atrophy. He maintained that in some cases there is a genetic weakness of the affected cells in the spinal cord, as the result of which lightning causes a selective injury of the nervous system. This is supported by the cerebrospinal sequelæ termed "electrotraumatic encephalomyeloses" [20] in which the clinical picture resembles disseminated sclerosis or G.P.I.

Preventive treatment is the knowledge of what to do in a thunderstorm.[7] This is particularly important in open country, on mountains, and in the tropics. It is safest to be inside a house, in a room with all the doors and windows closed, and away from the fireplace. Telephones are fitted with lightning arresters in this country and so may be used without danger. The main switch and meter of the electric-light supply, however, should be avoided. The lead-in wire from the aerial to a wireless set should be earthed. If there is no house, shed, cave, or closed motor-car available, the protection of a ditch or hollow should be sought. Crowds of people and the neighbourhood of domestic stock should be avoided, as should trees standing alone, wire fences, hedges, walls, and the banks of rivers and ponds. The centre of a wood is fairly safe. In the mountains it is well to be away from peaks, lone rocks, and other exposed spots. If one is to be struck it is better to be wet through, for wet clothing or even skin may short-circuit most of the current.

People struck by lightning, unconscious and apparently lifeless, should be treated by artificial respiration without delay. This should, if necessary, be continued for up to eight hours, and Silvester's or Eve's method is to be preferred because it is important to watch the patient's face and neck for the "deglutition phenomenon." According to JELLINEK, swallowing is the most reliable sign of the return of spontaneous breathing. When it starts it is imperative to stop artificial respiration at once.

9. Leys, D. *Edinb. med. J.* 1942, **49**, 657.
0. Loewenstein, K., Mendel, K. *Dtsch. Z. Nervenheilk.* 1932, **125**, 211.

Dr. JOHN ORR, who retired last year after 21 years as dean of the school of medicine of the Royal Colleges, Edinburgh, has been presented with gifts from students and lecturers in recognition of his services to the school. The balance of the amount subscribed is to be devoted to an annual prize for students.

THE seven supplements to the *British Pharmaceutical Codex* 1934 have now been issued as a single strongly bound volume (Pharmaceutical Press, 17, Bloomsbury Street, London, W.C.1. 21*s*. Postage 6*d*.). No attempt has been made to bring, for example, all the additional monographs, or all the amendments to the formulary, together, but the cumulative index to supplement 7, at the end of the book, covers all the supplements. This volume is a good deal handier than the seven separate ones, but let us hope that its appearance will not postpone the arrival of the *B.P.C.* 1941.

Annotations

ECOSOC AND HEALTH

THE Economic and Social Council's discussions on the future international health organisation make depressing reading. Pessimism at this stage would be unjustifiable, but it looks as though the health organisation had got off to as bad a start as the Security Council. It is somewhat difficult to discover what was said and what was decided, but from the documents slowly doled out to inquirers it seems that the only positive achievement was the resolution published on p. 324 in our last issue, convening a meeting of named experts on March 18 in Paris who are to draw up proposals for submission to the Economic and Social Council, to governments, and to a health conference to be held not later than June 20, probably in the United States. The Soviet representatives and their usual supporters asked for further delay but this request was not accepted and the Russians have refrained from nominating an expert on the preparatory committee.

Yugoslavia, surprisingly supported by Mr. Noel-Baker, suggested that the president of the permanent committee of the Office Internationale d'Hygiène Publique in Paris should be asked to postpone the meeting of his committee, already called for April 24, until after the health conference, on the ground that any decisions taken by the Paris Office might prejudice those of the conference. It would have been strange if the right of an ancient (in terms of international health) and statutory body to meet and set its finances in order and carry on its statutory work under the International Sanitary Conventions had thus been challenged by a body not yet in existence. But fortunately this resolution was not voted upon or formally adopted and has apparently lapsed.

The list of 16 experts contains some formidable names, including those of Sir Wilson Jameson and Surgeon-General Thomas Parran; but we are glad to know that representatives of the existing international bodies—namely, the Pan-American Sanitary Bureau, the Health Organisation of the League of Nations, the Paris Office, and UNRRA—are also to attend in a consultative capacity. The number of persons experienced in the organisational side of international public health can be numbered on the fingers of two hands; and the experience of the Health Organisation of the League should be particularly valuable. Some of the problems which will confront the preparatory committee and the conference have previously been outlined in these columns,[1] and we trust that they will endorse the unanimous feeling on the medical side that the new health organisation should be a special agency and not one of a number of committees within the Economic and Social Council, subject to the rise and fall of the council's fortunes. International health is too serious a matter to be made a political plaything or safety-valve.

A special British interest lies in seeing that the work of the Paris Office, so essential to maritime nations, is continued as effectively as in the past, whatever organ may be devised to carry it on. Finally, since the headquarters of UNO are to be in America, and presumably the Pan-American Sanitary Bureau is to continue there as a regional bureau, the headquarters of the new health organisation would best be in Europe.

THE PSYCHIATRIC SCENE

DOCTORS do not always like receiving advice from experts in education or administration; but they have come to see that if the non-medical expert has taken the trouble to know what he is talking about, what he says may be very valuable because of his detachment from professional bias and custom. Few would deny that Abraham Flexner, for example, did medicine a lot of

1. *Lancet*, 1945, ii, 177.

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good, not only in his native country. Of late it is the psychiatrists who have had the benefit, in the United States and here, of some informed and pungent comment from outside the fold. In 1944 Dr. Alan Gregg of the Rockefeller Foundation spoke to the American Psychiatric Association,[1] wittily about the foibles of the psychiatrist of today, and sagely about the directions in which the psychiatrist of tomorrow should develop his art and science. Sir Laurence Brock, until recently chairman of the Board of Control, has addressed a very similar audience, from a longer and more detailed acquaintance with the mental-health services. His Maudsley lecture, parts of which are printed in this issue, bears witness to his sympathetic grasp of a wide range of medical problems. For 17 years immersed in matters affecting the policy and routine of the very large branch of the health service that is centred on the mental hospitals, Sir Laurence has, like a true pupil of Morant, preserved a balance between principles and practice, aims and expedients, which has brought about steady progress in this difficult field. The Mental Treatment Act of 1930 was the prelude to a period of expansion and improvement which owed a great deal to the farsighted, steady, unobtrusive influence of Sir Laurence and his senior medical collaborator on the board, the late Sir Hubert Bond. In his lecture he leaves few major questions of policy untouched; doctors may disagree with some of his views, especially those on postgraduate education, and may think that he somewhat misconceives the nature and intention of the proposals of the Royal College of Physicians, but they will recognise the thorough knowledge and long experience which lie behind his sober optimism and proposals for reform.

ACUTE THYROTOXIC MYOPATHY

In the course of thyrotoxicosis some muscular weakness is usual, but this may become an outstanding symptom and give rise to three clinical syndromes which Brain[2] has called exophthalmic ophthalmoplegia, acute thyrotoxic myopathy, and chronic thyrotoxic myopathy. The first of these is characterised by gross exophthalmos with external ocular motor palsies which do not respond to 'Prostigmin,' and do not improve after thyroidectomy; the thyrotoxicosis in this syndrome is usually mild or moderate. In chronic thyrotoxic myopathy, weakness is accompanied by wasting of the proximal limb muscles, sometimes with loss of the tendon reflexes; the condition is therefore to be distinguished from others giving rise to obvious muscular atrophy, and the recognition of its thyrotoxic origin is important since thyroidectomy restores the muscles to normal.

Acute thyrotoxic myopathy is an even rarer condition, which only occurs with severe thyrotoxicosis and closely simulates myasthenia gravis, the weakness affecting the ocular muscles, the tongue, the palate, and the muscles of respiration and deglutition, besides the limb muscles. In all cases reported so far, death has followed the onset of this complication, and the very few attempts at thyroidectomy have been immediately fatal. Laurent,[3] reporting two examples which had ended fatally, showed that their muscular weakness responded to prostigmin injections as strikingly as does the weakness in myasthenia gravis, and he therefore suggested that successful thyroidectomy might be possible with the help of prostigmin. The course of the muscular weakness after thyroidectomy would indicate whether it had in fact depended on thyrotoxicosis or whether it was simply due to the chance occurrence of myasthenia gravis in a patient with thyrotoxicosis. In this issue Dr. Sheldon and Mr. Milnes Walker report such a case where acute generalised weakness, including dysphagia, dysarthria, and great weakness in coughing, responded to prostigmin so well that thyroidectomy could be carried out successfully. The weakness cleared up in a few weeks after the operation and the patient has since remained well for fifteen months, the prostigmin having been given up gradually. This successful outcome shows that there is an acute thyrotoxic myopathy which closely simulates myasthenia gravis even in its response to prostigmin, but is not identical with it, since thyroidectomy has repeatedly failed to relieve myasthenia gravis with a coincident thyrotoxicosis.

1. *Amer. J. Psychiat.* 1944, **101**, 285.
2. Brain, R. *Quart. J. Med.* 1938, **7**, 293.
3. Laurent, L. P. E. *Lancet*, 1944, **i**, 87.

ACCURACY IN BLOOD-COUNTS

When a patient's progress is being estimated by changes in the blood-count, how far are these changes of clinical significance and how much allowance must be made for the inherent errors of the techniques employed? A learned statistical survey of some aspects of this problem by Berg[1] of New York, though heavy going for those not experienced in statistics, helps to answer this question. Supposing the true red-cell count of a patient is 3 million per c.mm., Berg calculates that if 1000 counts are made, 682 will lie between 2,750,000 and 3,250,000 and 954 between 2,490,000 and 3,510,000. With a true count of 2 million per c.mm., 682 will lie between 1,820,000 and 2,180,000 and 954 between 1,640,000 and 2,360,000. So in red-cell counting there is, roughly speaking, a 68% chance of getting the count within ±8% and a 95% chance of ±16%. Similar calculations for white-cell counts show that there is a 68% chance of attaining ±10% and a 95% chance of ±20%. An attempt to estimate the accuracy of neutrophil counts, when 200 white cells are counted in a smear, shows that the corresponding figures are about ±7% for the 68% chance and ±14% for the 95% chance. Occasional counts may lie outside these limits. To take an extreme case, Berg calculates that 1 in 10,000 times, in a patient whose true red-cell count is 4,640,000 per c.mm., results as far apart as 3,720,000 and 6,000,000 may occur! Another aspect of the accuracy of differential white-cell counts was referred to by Discombe in our issue of Feb. 9 (p. 195); he showed that, when counting cells like eosinophils that occur in small proportions, a very large number of cells must be counted to obtain a reasonable degree of accuracy; if 200 cells were counted on a smear, and the correct eosinophil proportion was 3%, 77% of the counts could be expected to lie between 1·5% and 5·0% and only 16·3% would be correct within 0·1%. Discombe therefore recommends a counting-chamber technique in which a large number of cells can be counted with considerable improvement in accuracy.

All these figures go to show that even when the techniques are followed carefully we cannot expect a much greater accuracy than ±10% in the results on two occasions out of three, and that in differential white-cell counts accuracy depends on the number of cells counted. These conclusions agree with the estimates that practical technicians, well trained in the techniques, have formed from their own experience; any hæmatologist who knows his work will say that ±10% is the best that can be expected from hæmocytometry or hæmoglobinometry, and therefore counts differing by less than 20% are not significant. For differential white-cell counts the method of counting two sets of 200 cells and stopping there if they are in fair agreement is adequate; for cells present in small percentages the hæmocytometer technique is clearly applicable, and in these ways a ±10% accuracy can be expected.

For ordinary clinical work an accuracy of this degree is more than sufficient; it matters little whether a red-cell count is reported as 900,000 or 1,100,000 per c.mm.; no clinician would consider such a change significant; but there is a tendency to interpret as "progress" similar changes when the count is higher—e.g., from

1. Berg, W. N. *Amer. Rev. Tuberc.* 1945, **52**, 179.

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3,600,000 to 4,400,000 per c.mm. In the same way a fall in polymorphs in, say, a patient having a sulphonamide from 77% to 63% is not significant; it is within the range of error, and from the clinical point of view only a much larger change should be taken as a warning of the onset of toxic leucopenia. Clinically significant changes are of wider range than ±10%, but, all the same, accurate hæmocytometry cannot be attained casually, since once further errors are allowed to creep in the range widens rapidly and the results, especially when following the progress of a case, become worthless. If the range of error is to be kept within reasonable limits, blood-counting is still a job for the experienced technician. Nevertheless, the occasional counter should not be discouraged so long as he remembers the large possible range of variation and only accepts as significant changes of, say, more than 50%; after all, he has always the patient before him, and both clinical and laboratory estimates of a patient's condition should be considered in assessing progress.

THE LAST OF LIFE

FIFTY years have passed since Charles Booth wrote his classical book on the condition of the aged poor in England and Wales, a survey which for the first time demonstrated the close connexion between old age and poverty. Since then conditions have changed in several directions; while developments in social services have taken away the worst sting of poverty, they have made it possible to aim more at the promotion of happiness than at the mere preservation of existence. At the same time the population has aged and continues to age; so it is not surprising that an increasing number of bodies, official and voluntary, are coming to take an interest in old people. The Society of Friends, the British Red Cross Society, the Nuffield Foundation, and the National Old People's Welfare Committee have all made studies of the subject, as well as the Council of Social Service and P.E.P.; and various social surveys, official and otherwise, have emphasised the importance of old people in the modern world. From the mass of information that has been collected certain points emerge clearly—that the great majority of old people cling to their independence, are anxious if at all possible to preserve a home of their own, have a fear of institutions and a dread of regimentation, but are yet unwilling to be "lost" or left entirely to their own resources.

A short guide to practical work for the welfare of old people, just published for the National Old People's Welfare Committee,[1] begins by saying that "many people find themselves very lonely as the years go on," and then discusses what can be done to combat this loneliness and to promote happiness. It is not always easy to find out what can be done to help old folks without at the same time appearing inquisitive. It is important that the visitor should be accepted as a friend. In the nature of things, visiting of this kind can often best be done by voluntary workers, provided they have a flair for the work or are willing to learn how to do it well. After considering the provision of home-helps in suitable cases—at present practicable only on a limited scale—the booklet deals with the supply of communal meals, as developed in Woolwich, and with the mobile canteens which have offered at least one good meal a day to old people who would not otherwise get any. It is pointed out that the closure of British Restaurants will exaggerate the feeding difficulties of many old people, and attention is directed to the possibility of maintaining, as a service for the aged, some facilities of British Restaurant type. The booklet is enthusiastic about the possibilities of clubs for the aged, and has much to say about their equipment and organisation; and particularly about the importance of an informal atmosphere and facilities for suitable work for these old people—and they are many—who hanker after doing something useful.

It is not surprising that the booklet deals at length with housing, pointing out that only 1% of houses built between the wars were specifically designed for old people, though 10% of the population fell into that category. Our readers will remember that a paper from Glasgow[2] recently made the same point, suggesting that local authorities should be obliged to include plans for small dwellings for old couples and solitary old people in the proportion of 10–15% of their housing schemes. Such houses should of course be appropriately planned; but, as we have already urged,[3] they should not be "colonised," for there is advantage to both young and old in preserving the balance of elements of population in a community. Many old people, too, are anxious not to move away from the immediate locality in which they have spent their lives: they are often much happier living under unsuitable conditions among the people they know than under superior conditions among strangers.

The booklet also deals with residential homes for old people, a subject on which the Society of Friends[4] published an interesting brochure last year. It has been demonstrated that such homes, if not too large and of suitable plan, can be very successful.

B.M.A. OPENS EMERGENCY FUND

THE council of the British Medical Association have decided to establish an Emergency Guarantee Fund, with themselves as its trustees, to be used "to further the cause of the medical profession in any major dispute which may occur between the Government and the medical profession in connexion with the proposals for a National Health Service." The fund will be in two distinct parts, A and B. The A fund will provide the general funds from which the administrative, propaganda, and allied expenditure will be met. The B fund will be used for the purposes of the A fund and in addition, within its limits, for compensation of individual practitioners "who, because of their adherence to the cause of the profession, suffer exceptional financial hardship." The B.M.A. has guaranteed a sum of £100,000 to fund A. The trustees of the National Insurance Defence Fund will consider at their next meeting what their contribution to fund B shall be. The B.M.A. council urge every member of the profession to guarantee as substantial an amount as he can afford to part B of the fund. "Normally this guarantee should be not less than £25, and it is hoped that in many cases it will be much more."

Until the trustees so decide, the fund will remain in the form of guarantees. "If and when the trustees deem it expedient, in the light of current events, the amounts so guaranteed, by individuals as well as bodies, will be called in and used at the trustees' discretion in maintaining the interests and honour of the medical profession." Forms of guarantee will be circulated to doctors in the next few weeks.

EDITORSHIP OF "THE PRACTITIONER"

Sir HENEAGE OGILVIE has been appointed editor of the *Practitioner* in succession to Dr. Alan Moncrieff. Surgeon to Guy's Hospital and a vice-president of the Royal College of Surgeons, Sir Heneage was appointed K.B.E. in the New Year for his war services as a consulting surgeon to the Army. Dr. Moncrieff, who has been senior editor of the *Practitioner* since 1943, has resigned on his appointment to the new Nuffield chair of child health in the University of London. Dr. William A. R. Thomson, who joined the *Practitioner* in 1944, will continue as associate editor.

1. Old People's Welfare. Published for the National Old People's Welfare Committee by the National Council of Social Service, 26, Bedford Square, London, W.C.1, 1s. 6d. post free.
2. Curran, M., Hamilton, J., Orr, J. S., Poole, W., and Thomson, E. N. *Lancet*, Feb. 2, p. 149.
3. *Lancet*, Feb. 16, p. 244.
4. Friends' Relief Service, Hostels for Old People. Friends' Book Centre, 1945, 1s. 6d.

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Reconstruction

FAMILY HEALTH

K. E. BARLOW
M.R.C.S., D.M.R.

THE consulting-room is like a test-tube, in that the means of observation conditions what is observed. Specialisation of technique has tended to split medical knowledge into isolated departments. This has made of the consulting-room a place where certain precisely labelled diseases are sought; and the reorganisation of medicine which is now envisaged is based on a drive to make this search more effective.

Consideration of the biological nature of man has led many to question whether such methods are by themselves sufficient. The patient is part of a home, and his home is part of a society; home and society are, biologically, part of the organism's environment. The geneticist knows that the family is the place in which to study the interchanges in which he is interested. The family is not only the channel of heredity: it is also the unit which administers the intimate environment. It provides the cellular activity out of which the tissues of society are built. Whether society recognises this or not, it is clear that its amenities—its farming, its housing, and its many services—all touch at some point upon the life of the family within the home. At many levels medicine has been constrained to consider these environmental factors of the family; welfare and vocational guidance clinics, industrial medicine, nutritional studies, and the control of water and sewage systems are all concerned with the influence of environment upon the home.

Although the home is in its nature unitary and integral, the beginnings of social medicine are still fragmentary and dispersive. If we are ever to understand society as the biological field of the family—which to the biologist is what it must appear—we must have access to a field which can be observed as a whole. In other words, an experimental community is required. When an experimental centre was established at Peckham for observing the leisure activities of a community of families, it provided for the first time the conditions necessary for this type of biological inquiry. Five years sufficed to show the immense promise of the new method thus introduced. It has demonstrated the profound pathological influence of the family's contemporary urban environment; moreover, it has shown how biological observation of a still larger group of families can be usefully undertaken.

THE COVENTRY VENTURE

Communities in several towns are now organising themselves to take advantage of the Peckham methods. The most advanced of these, which may claim to be the prototype, is at Coventry. It is interesting that the scheme originated among working people who seized enthusiastically the opportunity of fashioning their own social environment. To this end the Family Health Club Housing Society (Coventry) Ltd. was formed in March, 1945, to promote the development of a townlet of 7000 people. The community will have its own farm to supply first-quality protective foods to expectant mothers and young children; it will provide housing for 2000 families, including flats, a family health club of the Peckham type, shops, pubs, a cinema, and, in coöperation with the local education authority, its own schools.

The site which has been secured at Binley, to the east of the city, is unhappily second-rate: it is, however, the only area which the society was able to acquire within ready reach of workplaces. The loan of money for building has been tentatively agreed with a friendly society on advantageous terms. Houses, which will be of mixed types, will be let on weekly rentals. Families are now being recruited, and it is a condition of tenancy that the family shall pay a weekly subscription of 2*s.* 6*d.* per family to the family health club, when it is established, and shall attend once a year for health overhaul. Steps have thus been taken to collect a mixed community eager to participate in the experiment, to make the health club self-supporting, and to ensure that it shall be within easy walking distance of all homes.

The relationship of the new townlet with local authorities and existing medical and other services is at present being worked out. The housing society has consulted with the medical officers of both the city and the county, as well as with the other officers of the bodies concerned. The town-planning committee of the Coventry City Council has approved the scheme in principle.

As at Peckham, no treatment will be given at the health club. Patients will be referred to the local practitioners, whose good will, it seems, is already assured; the club's service will be entirely supplementary to that provided under the impending legislation. In public health, the examination of school-children, infant welfare, and maternity will come within the province of the club, and it is hoped that careful dovetailing will eliminate duplication. The siting of schools will be important in these arrangements.

Necessary as this description is to an understanding of what is proposed, it must be emphasised that we are concerned with no mere effort at neighbourhood planning. What we seek to promote is a social environment which will be adaptable to family development, just as the intimate environment of the ovum is to its. The purpose of the overhaul is to review the function and development of each family and each member. Observation of leisure-time activity is an indispensable part of this assessment, for only by observing families in society can social competence be judged. Here we are in the territory of health, but disease is relevant to the inquiry for its effect in limiting the range of living. Social health depends upon the budding and development of faculties and skills; the change in the environment from this budding and development should be such as to favour differentiation and maturity. The quality of the social soil is critical to the growth of the human seed.

It is interesting that in some senses the Family Health Club Housing Society is already a community. The tenants who are recruited meet weekly to develop the arrangements for their own social world. Although these arrangements are as yet on paper only, the stimulus of a live environment is beginning to evoke undisclosed talent and skill; a considerable educational achievement may already be claimed.

STUDY OF ÆTIOLOGY

In terms of medicine, it is clear that experiments of this order promise a shift of emphasis from pathology to ætiology. In the consulting-room ætiological factors are remote, but when the organism is observed in its environment, they are operating at the time of observation.

Now that medicine is being reorganised, is it too much to ask that the ætiology of disease and the establishment of the norms of health shall receive at least some consideration by the medical administrators and the Minister of Health? As the whole set-up of medicine is in flux, are there not good grounds for giving an absolute priority to the establishment of the prototype experiments on which these inquiries must be based?

THE N.W. London Blood Supply Depot at Slough and N.E. London Blood Supply Depot at Luton are amalgamating, and from March 11 will operate as the North London Blood Supply Depot, in the charge of Dr. J. V. Shone, at Shaftesbury Avenue, East Barnet, Herts (Tel.: Barnet 0165). Dr. Shone has been in joint charge of the two depots for some months.

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Towards Social Security

Payments Before and After Childbirth

THE white-paper summarising the National Insurance Bill says plainly that "for a woman who ordinarily follows a gainful occupation, there will be in addition a maternity allowance of 36s. a week for 13 weeks beginning about 6 weeks before her confinement is expected, provided that she abstains from work." It is important for doctors to consider how far this general statement is justified by the terms of the Bill.

Study of the text suggests that if a woman does not draw allowances for the full 6 weeks before confinement, she cannot make up the full 13 weeks' payments by drawing more allowances after confinement. Is this reasonable? There may be several reasons why a woman does not start drawing her allowance 6 weeks before her child is born. First, she may choose to continue some form of employment which is not incompatible with her condition. Secondly, the doctor or midwife, on the information available, may not feel able to sign the official form prophesying that there is only 6 weeks to go. (Midwives are accounted "qualified practitioners" under the Bill.) Thirdly, the medical referee may have set aside that official form; and against his decision there seems to be no appeal, even though events may prove him wrong. Or, finally, the baby may disregard everybody's convenience and arrive earlier than expected. Two questions at once emerge from this interpretation of section 15 of the Bill. Is public opinion generally going to be satisfied that these allowances must stop 7 weeks after confinement, even if this reduces by nearly half the amount paid to some of the mothers? And are the unfortunate doctors and midwives going to be embroiled with patients and relatives or with medical referees because a late start cannot be made up at the other end?—It is only fair to add that if the confinement is later than officially expected, the allowance continues for at least 6 weeks after the actual date.

Regulations under this Bill may disqualify a woman from receiving the maternity allowance if she fails without good cause to observe any prescribed rules of behaviour. While such rules may in the past have been a useful weapon in the background when dealing with cases of ordinary incapacity approaching the margin for capacity for work, it is hard to see what bearing they can have on the case of a woman who is admittedly within 6 weeks of her expected confinement. Within reason and under medical guidance a little physical activity—even light work at home—coupled with mental relaxation may be greatly to be desired. Certain it is that the usual rules of behaviour during sickness are not appropriate at this time. This I feel is a matter that should be left to medical supervision rather than lay administration. The mere publication of rules of this kind—even though intended only for the exceptional case—would tend to cause mischief in the public mind.

Again, regulations may permit the withholding of allowance if the woman without good cause fails to attend or submit herself to medical examination by a referee. Experience with the corresponding benefits under the National Health Insurance Act shows that in cases of this kind the considerations applicable to pregnancy are exactly opposite to those applicable to ordinary incapacity. In pregnancy the necessary time-lag in giving notice of examination, &c., means that the patient is rapidly approaching the time when the case would be one for benefit without question. In sickness, on the other hand, the time-lag means that the time of an agreed ending of benefit is approaching. In pregnancy, it becomes increasingly doubtful whether the patient should be asked to travel; in sickness, progress towards recovery may make it easier to do so. Obviously, questions of difficulty if not delicacy will arise if some unthinking lay official does what some approved societies used to do for dental benefit—i.e., cites a definite percentage of cases for a second opinion, without specific grounds for doing so. Even in the normal days of peace, London patients were often required to travel for half an hour in train or bus in going to Westminster for medical examination, and it does not require much imagination to anticipate the phrases which might be used in a subsequent letter of complaint from the husband, especially with travelling conditions as they are likely to be in the next few years. Of course, there will no doubt be the old arrangement whereby the practitioner in attendance can certify that the patient is "unfit to travel," but there will be many cases where a practitioner would not wish to write a paper which conveys a suggestion of invalidism and yet would not wish the patient to choose between travelling some distance for examination by an unknown referee or else forgoing the allowances.

The attempt to fix a definite period of 6 weeks before the date of confinement follows from the Washington Convention—not yet ratified by this country—which contemplated the prohibition of employment for this period. But our main object at present surely is to provide cash allowances for the person who does in fact, on medical advice, relinquish employment, and I trust there will be enough latitude in administration to permit some special weight being attached to the views of the doctor in attendance.

Payment of sickness benefit during pregnancy has always been a difficult problem under National Health Insurance, especially as the practice of different approved societies has varied widely. In general terms it has always been understood that pregnancy itself is not an incapacity, and it has therefore been necessary to look for some complication to justify certification. Nevertheless the wisdom of laying off work in the final weeks is so obvious that the simple certification of "pregnancy" has been accepted unchallenged for some time by many approved societies subject to inquiry in suitable cases from the doctor as to the period yet to run.

Presumably the administration of the new sickness benefit (26s. a week without limitation of time) will need to be dovetailed with these new maternity allowances (36s. a week) in the case of all women who are still actually in employment. It may be found that much of the difficulty arises from the two separate rates of payment, though obviously the higher rate is justified for the maternity allowances themselves.

JUSTINIAN.

ROYAL COLLEGE OF SURGEONS OF ENGLAND

AT the Hunterian dinner reported in our issue of Feb. 23, the President said that he had received a letter from Sir William H. Collins. The following is its text:

My dear President,

I have been disturbed for some time because it seemed to me that possibly financial considerations were preventing the Royal College of Physicians transferring their headquarters to Lincoln's Inn Fields. In order to help to remove any such difficulty which may be standing in the way of the establishment of a Medical Academic Centre in London, I am making a further gift of £100,000 to the Royal College of Surgeons to provide increased endowment for the Scientific Departments. The gift is made on condition that the Council offers all the sites and property which they own to the east of the College and which are not required for the extension of the Royal College of Surgeons as a free gift to the Royal College of Physicians. The offer by the Royal College of Surgeons must be conditional on the site being used for a new building for the Royal College of Physicians and must be kept open for at least twelve months.

Yours sincerely,
W. H. COLLINS.

The council of the Royal College of Surgeons has accepted with extreme gratitude the conditions laid down and has made a formal offer of the site to the Royal College of Physicians in accordance with Sir William Collins's wish.

THE Royal Medical Foundation of Epsom College announces that a Cheyne annuity of £35 per annum will be awarded in May to the spinster daughter of a medical man; candidates must be Protestants, over 65 years of age, whose income is not more than £120 per annum, irrespective of help from the Royal Medical Benevolent Fund. A Dr. T. W. Thomas annuity of at least £25 is open to a spinster daughter of a medical man, over 40 years of age. Application must be made by April 18 on forms obtainable from the secretary, Epsom College, Surrey.

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Medicine and the Law

Raynaud's Disease and Workmen's Compensation

AT question time in the House of Commons last November the Minister of National Insurance was asked about the suggested increase in the incidence of Raynaud's disease (" dead hand ") or disabilities at a Manchester factory where workmen were employed at vibrating rotary machines. Was he aware that many such cases had been diagnosed and certified by local medical practitioners and that claims for compensation failed because the disease was not scheduled, while in common-law cases the medical evidence was not deemed sufficient to justify an award? The Minister replied that research had been undertaken into the effect of using electrically driven vibrating tools in factories in Lancashire and Cheshire; he was advised, however, that there was insufficient evidence that Raynaud's disease was so specific to employment as to warrant its inclusion in the schedule of industrial diseases under the Workmen's Compensation Act.

On the third reading of the National Insurance (Industrial Injuries) Bill on Feb. 22 the Minister announced that he was setting up an expert committee to examine the problem. He felt that the task of the Home Office in the past in scheduling industrial diseases had been simpler than his Ministry was likely to find it in the future. Miner's nystagmus, for instance, was fairly easily recognisable by accepted medical standards, but, with the growing mechanisation of our industries, we had reached a stage where it was harder to draw the line between a disease which was constitutional or which arose from natural causes and one which was due to industrial employment.

Meanwhile an important decision has been given in the Court of Appeal in Fitzsimons *v.* Ford Motor Co. (Aero Engines). A rotary fitter, operating an electrical machine which revolved at high speed, had been said to be suffering from Raynaud's disease as a result of his work. He applied for compensation under the Workmen's Compensation Act, claiming to have suffered injury by accident through using the machine over a period of nineteen months. The Salford county-court judge held that the incapacity was not due to " accident," but the Court of Appeal have reversed the decision. Lord Justice Scott held that each vibration of the rotating machine gave an infinitesimal blow to the workman's hand and arm; the nerves which controlled the blood-supply were thus damaged, and " dead hand " resulted. The man had been injured by accident inasmuch as there had been a succession of accidental injuries.

The law of workmen's compensation, of course, will be superseded when the National Insurance (Industrial Injuries) Bill becomes law. Part IV of that Bill, as at present framed, insures workers against any " prescribed " disease or " prescribed " personal injury not caused by accident arising out of and in the course of their employment, " being a disease or injury due to the nature of that employment " and one which has developed after such date as the Minister may appoint. He may " prescribe " a disease or injury if he is satisfied, in relation to any insured persons, that—

" (*a*) it ought to be treated, having regard to its causes and incidence and any other relevant considerations, as a risk of their occupations and not as a risk common to all persons; and

" (*b*) it is such that, in the absence of special circumstances, the attribution of particular cases to the nature of the employment can be established or presumed with reasonable certainty."

Last November the Minister was not satisfied that Raynaud's disease was, so to speak, occupational. On Feb. 22 he declared his intention of having the matter examined by experts. Yet on that very day the law-courts, in the Fitzsimons case, recognised the workmen's right to compensation in respect of this disability and found themselves able to attribute it to accident (albeit a succession of small accidents) without troubling over the gradual onset of an industrial disease. The Minister, it seems, will not need either to " schedule " it under the Workmen's Compensation Act or to " prescribe " it under the prospective law.

Parliament

ON THE FLOOR OF THE HOUSE

THE debate on agriculture on Feb. 25 was one of the most interesting although least spectacular. It turned not on grievances of farmers but on a world policy of good nutrition. We. and all other nations, are linked to an international policy of good nutrition originally set forth at the Hot Springs conference, and Mr. J. Westwood, speaking in his capacity as Minister of Agriculture for Scotland, one of the facets of the Secretary for Scotland's office, considered that its policy must be the foundation on which we are to build. The provision of good nutrition for all the world is not now an aspiration; it is being worked out in precise surveys and suitable policies for different parts of the world, as for instance the recent work on nutrition in the West Indies. Looking far ahead, Mr. Westwood suggested that by the year 2000 the world population would probably have doubled its present figure and only by applying Hot Springs principles could proper levels of nutrition be achieved.

The effect of this on our own policy in this country Mr. P. H. Collick, parliamentary secretary for agriculture, said had been to bring home to industrialists and ordinary townspeople their unity of interest with the countryside. True, as Mr. Collick said, it has taken two world wars to make people realise the necessity for making the fullest use of the land, and only on this foundation can a satisfactory nutritional policy be developed and maintained. This means fixed prices for the main agricultural products and a stable and assured market. Spread these conditions over the world farming production and you have the basis of a world civilisation.

On the Tuesday we turned from the scientifically objective questions discussed on Monday—in a thin House, by the way—to the prickly question of the repeal of the Trades Disputes Act, when declamatory and sizzling speeches were delivered to a packed House. On Wednesday and Thursday we had the debate on the fundamental economic necessities of the nation, its manpower and production. And here again there was more agreement than disagreement and more constructive suggestions than wrecking tactics. Parliamentary debates of the good old days of Parnell and Asquith have gone. The new world is one of economic organisation and of scientific direction. Mr. Attlee was hopeful that there would be more goods for all by the end of the year.

MEDICUS, M.P.

FROM THE PRESS GALLERY

Insurance of Industrial Injuries

In the House of Commons on Feb. 22 Mr. G. S. LINDGREN, in moving the third reading of the National Insurance (Industrial Injuries) Bill, said that the measure carried forward a good deal from the schemes for workmen's compensation which it replaced. But it also owed a great deal to the experience gained in operating the Royal Warrants which provided for war-time casualties. The Government thought that the Bill was now a better measure as a result of the amendments. Of course improvements in benefits meant increased expenditure. So far as he could judge when the scheme reached maturity the total expenditure might amount to rather more than £32 million a year, of which £6 million would be the cost of amendments made since the Bill was introduced.

Mr. O. PEAKE pointed out that during the committee stage the gaps in the benefits for industrial injuries and sickness or unemployment had widened, and now, taking the basic scales of payment, they had to compare 45*s.* under this Bill with 26*s.* under the National Insurance scheme. Supposing it was possible within the next ten years to increase that sum of 26*s.* to 35*s.*, would there not, meantime, have been an unanswerable demand to increase the 45*s.* under

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this Bill to a still higher figure? Therefore, he asked, had we not now to abandon for ever the idea that these schemes could be unified?

Mr. A. E. BECHERVAISE thought it was unfair both to the local authority and to the man or woman that if a recipient entered an institution no benefit would be payable. Some provision should be made for reimbursing the local authorities and for pocket-money to the inmate. Mr. A. MOYLE was gratified that nurses who contracted tuberculosis in the course of their work would have a right to make a claim under this Bill, though it would be difficult to establish as the disease was not scheduled. He hoped that when the committee was appointed to review the existing schedule of industrial diseases it might be found possible to bring such diseases within its scope.

Mr. J. GRIFFITHS, Minister of National Insurance, while admitting that there was a substantial gap between the benefits provided under this Bill and those proposed in the National Insurance Bill, hoped that it might be possible in ten years to unify the scheme. When that was done it would be a departure from the contributory principle and an acceptance of the principle of that obligation being covered out of State funds. The question of industrial diseases was difficult, but important. The definition in the Bill was sufficiently wide to enable tuberculosis contracted by health workers to be scheduled if the evidence brought before him was strong enough. In the past the task of scheduling industrial diseases had been easier than it would be in the future. Miner's nystagmus, for example, was fairly easily recognisable by accepted medical standards. But owing to mechanisation it was now often difficult to draw the line between the disease which was constitutional or which arose from natural causes, and the disease due to industrial causes. To help him he proposed to set up a committee with both medical and lay members to examine the problem. At the moment he was considering the claims put forward on behalf of the nurses and also the claims for Raynaud's disease which had suddenly come into prominence. It was claimed in one factory that there had been scores of cases of that disease due to the effect of vibratory tools on the hand. He thought that the clauses in this Bill were sufficiently wide to enable the Minister to bring in the nurses and the other cases if he was satisfied with the evidence, but it was essential for the future to have a fresh examination of this problem. The right of the injured workman to preserve his freedom of choice of medical practitioner would be more relevant for discussion when the proposals for the new National Health Service came before the House.

QUESTION TIME

Measles and Scarlet Fever

Mr. W. D. KENDALL asked the Minister of Health what were the death-rates from measles and scarlet fever for the years 1924, 1925, 1944, and 1945; and to what extent inoculations had been used to prevent these diseases.—Mr. A. BEVAN replied: The death-rates from measles and scarlet fever, per million living, in England and Wales were as follows:

	1924	*1925*	*1944*	*1945*
Measles	118	129	6	18
Scarlet fever ..	20	22	3	3

The rates for 1944 and 1945 relate to civilians only, and the rates for 1945 are provisional. I am advised that no satisfactory method of inoculation against measles or scarlet fever has yet been evolved.

Recruits for the Medical Services

Mr. G. ALLIGHAN asked the Minister of Health what had been the distribution of recruits to the medical branches of the three Services since June 18, 1945.—Mr. BEVAN replied: Since June 18 the distribution has been: Navy (to Feb. 25), 105; Army (to Jan. 31), 433; and Royal Air Force (to Jan. 31), 33.

Release of R.A.F. Medical Officers

Colonel M. STODDART-SCOTT asked the Under-Secretary of State for Air what age and service group of non-specialist medical officers would be demobilised from the R.A.F. in March; how much was the R.A.F. behind the Army and Navy; and the reasons for this lag.—Mr. G. ALLIGHAN asked why release of general-duty medical officers in the R.A.F. in March would be 10 groups behind that of equivalent officers in the Army, while the bulk of the new recruits to the medical branches of the Services were being directed to the Army.—Mr. JOHN STRACHEY replied: Medical officers in the Royal Air Force in groups 28 and 29 will be released in March. I understand that general-duty medical officers in the Army are now being released up to group 38 and their colleagues in the Naval Medical Service will be released up to group 47 by the end of March. The release of medical officers is slower in the Royal Air Force than in the other two Services because the war-time proportion of medical officers in the Royal Air Force has been much lower than in the Army or the Navy. The distribution of recruits to the three Medical Services is still under consideration, but we are hoping to receive an allocation which will help to even up the release rate. Of course, differences of this kind between the three Services are not confined to medical officers alone.

Doctors in Austria

Colonel M. STODDART-SCOTT asked the Chancellor of the Duchy of Lancaster if he had been informed of the shortage of doctors at the University of Vienna and throughout Austria; what was he prepared to do to meet the situation; and would he consult with the Minister of Health so that the temporary registration of Austrian doctors in this country might be withdrawn in order to encourage them to return to their own country.—Mr. J. HYND replied: My information, on the contrary, is that there is at present no general shortage of doctors either at the University of Vienna or throughout Austria.

Non-British Practitioners in the Services

Lieut.-Colonel HARRY MORRIS asked the Secretary of State for War why his department had decided not to consider further applications for service from non-British medical practitioners unless they were in a specialist category.—Mr. J. J. LAWSON replied: The War Office has accepted upwards of 500 non-British practitioners for service as medical officers in the R.A.M.C. during the war. The end of the war and the rapid run down in all theatres has resulted in a reduction of the number of posts in which these practitioners can suitably be employed. In consequence, no further appointments are being made, except in the case of those in the specialist category. Non-British practitioners already serving who have been recommended are, however, permitted to extend their service until general demobilisation or for so long as their services are required.

Priority Telephone Calls for Doctors

Mrs. L. A. MIDDLETON asked the Assistant Postmaster-General whether he would reintroduce a system of priority telephone calls for members of the medical profession similar to that which operated formerly under the National Telephone Company, in order to obviate the long delays in securing hospital beds for patients and in making other calls upon which the health, and sometimes the lives, of patients might depend.—Mr. W. A. BURKE replied: When a member of the medical profession has to make a vitally urgent call, the operator will give the call priority if the urgency is explained at the time.

Supply of Textbooks

Major K. S. D. DIGBY asked the Minister of Health if he was aware that girls taking a course of midwifery were unable to obtain the textbooks they need; and, having regard to the shortage of trained nurses in every field of medicine, what steps he was taking to ensure that the necessary textbooks were made available.—Mr. BEVAN replied: I am aware that there is difficulty in obtaining midwifery as well as other textbooks owing to the shortage of paper and printing labour. I have discussed the matter with the President of the Board of Trade, who has arranged for considerably increased supplies of paper to be made available to publishers, and for 750 printing operatives to be released from the Forces under class B in order to ease the labour shortage.

. . . . If today we want houses, clothes, coal, food, the necessities and amenities of life, we have to realise that we cannot depend on other people doing their best to provide for us unless we are ourselves rendering the best service we can.—Mr. ATTLEE, *Hansard*, Feb. 27, para. 1970.

In *The Times* of Feb. 28 it is stated that Dr. ALDO CASTELLANI has been absolved by the investigating commissions of charges of collaboration with Fascism. He therefore retains his seat in the senate and his chair in the University of Rome.

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In England Now

A Running Commentary by Peripatetic Correspondents

We went to meet Mary, now no longer a WAAF, at our country railway-station, and wondered whether we would know her out of uniform. We were a minute or two late at the station, and she was standing, easily recognisable, outside the booking-office. We pulled up with welcoming grimaces, and beckoned her across. To our mild astonishment she looked rather angry and waved us on. By cajoling her like a nature-lover offering peas to a pigeon we at last persuaded her to cross the road and look in at the off-side door. "Oh, it's you," she said, and then added suspiciously, "Is it you?" We assured her that it was and invited her to get in, but she still seemed dubious and after looking severely into the back of the car shut the door again as though the interview was now closed. "Get in," I begged. "Well," she said after a moment of frowning thought, "if it's you perhaps I'd better get in." To make it even more of a concession she walked right round the car and got in at the other door. I asked after her brother and sister. "They've gone," she said, "just gone." "But were they with you? When did they go?" "Oh—just then—on bicycles," she replied, inconsequently. We drove on, puzzling. "But I wish I had seen them," I said at last. "Who?" she asked. "Elizabeth and Henry." "Oh," she said, as though with new light on a difficult point, "but they're in London." I gave it up and stopped for petrol. "Yes, it's a fine building," she agreed—though not with any remark from either of us—looking at the rather shabby petrol station. "Byzantine," said Charles, taking a hand. "Now you're making fun of me," she said, laughing. We showed her the weir and the mill-pool, where, we assured her, you can usually see fish. After pondering for some time she asked whether you could ever see fish there. "Tell us what the weather is going to be," I suggested, for Mary had been in Met. She was on the spot at once. "Ah, now!" she said, "I think we shall have some snow, but it may pass you by; it depends on the lie of the country. But it'll certainly freeze tonight." "In that case," I said, "I'd better put the lamp in the car." "They won't like *that*," she said confidently. Charles and I looked at each other with faces growing longer and longer. But at tea Mary was completely herself. Not a single random remark fell from her; she ate heartily and was evidently out of whatever daze she had been in.

Later I asked her what had been going on. It seems she had been in this hazy state once or twice before, usually on getting up in the morning; this time she had been asleep in the train. The trouble is that she half wakes, but continues her dream, and the strain of continuing two mutually exclusive lives at once is considerable. She has been on night duty every fourth night for several years. I have seen the same sort of thing in children, but is it at all common in the fully grown?

* * *

This tale has all the proper ingredients—lovely heroine, treasure trove, blackavised villains, and handsome hero—everything, that is, except the romantic ending. It concerns a pair of pantaloni, which started life as a nylon parachute and finished as the pyjama trousers of a little red-headed American girl working for a relief organisation at Lecce, which is just about where you would put the pin through the "heel" of Italy.

Returning to her lodgings to lunch one day, she found that her newly washed pantaloni, put out to dry on the windowsill, had disappeared. The chambermaid was dispatched to make inquiries in the café below. Yes, the pantaloni had indeed fallen on to a table—greatly, it was understood, to the scandal of the customers—and a boy had taken them immediately to the porter of the apartments above. Further inquiries revealed that porter and pantaloni had disappeared. Off went the boy to the porter's house. The latter's wife disclaimed all knowledge of the pantaloni and said her husband had gone to see a dying relative in Bari. The pantaloni-less heroine, her small chin now sticking "way out," called in the carabinieri and was assured by their dashing lieutenant that all would be well. Next day, enter two villains, disclosing themselves as relatives of the missing porter. Alas, the dreaded carabinieri had descended on the house, dungeons threatened, and if the most beautiful and sympathetic signorina would only stay the carabinieri's hand, they swore by all the Saints that the pantaloni would be restored. Two days later the pantaloni were mysteriously delivered by the small boy from the café. Scenes of universal rejoicing. No questions asked. Honour satisfied all round. What became of the porter, no-one knows.

* * *

Those who know that admirable Penguin *A Naturalist goes to War* will have read of the fabulous Poona's contribution to the end of the last war, how it missed the declaration of the Armistice on Nov. 11 because signals were not opened after midday and was upbraided in the press for failing to arrange victory celebrations, but retrieved itself by decreeing that all R.A.M.C. officers take a post-armistice course in mule-saddling before breakfast. I missed being in Poona for the end of this war by a few months. But Poona was already getting into training for the event. During my last few months there it fell periodically to my lot, as a fairly senior medical specialist (and incidentally, a pair of hands badly needed by my civilian hospital), to patrol the streets of Poona in the place of a military police patrol, and to take the names of soldiers failing to salute. The order had said that one member of the patrol should be the Commanding Officer of a Unit, or a senior officer. My own C.O. thought the idea a splendid one, but, not seeing fit to take part in it himself, decreed that my surgical colleague and I should take it in turn. Imagine me, then, pacing with measured tread the thoroughfares of Poona, and sporting for the first time in my life a military cane, a prodigious cane which must have indicated to all but the very dullest what was in the wind. I did my best, but somehow I was not a success.

* * *

Having had this case-report refused by the editors of *Proc. R. Soc. Dermatol.* and of the *News of the Psych. World*, I must try it on I.E.N. The patient is a medical student who is a solid, beer-brawn-and-baccy sort of lad—or was till he got a new ringworm, *Tricophylon versicolor*, when his whole character changed. He went cissy and began to talk in rhythm and write verse. This connexion between the fungi and poetry has long been suspected, but never so readily demonstrated as in my case. I push the gentian violet and the lyrics cease; a spot of Whitfield's will bring an ode to an abrupt end. And it's not bad verse either; note the haunting poignancy in "The Scrum-half's Prayer"

When backs are marked with close fidelity
and mud-stained forwards plunge like maddened kine,
God grudge not the conjunction of us three—
me, the taut leather and the conquered line.

and there is a certain poetic starkness in his little poem "The Midder," which could hardly have come from a mind unstimulated by toxins.

Slate-grey like a dawn advancing,
glimpsed by the watcher, hoping,
wet with a tidal surging,
this is the coming of man.

All these poets sooner or later fall for the nightingale. Most of them call the singer "she," when they mean the cock. Our poet, whether from his biological training or strongly heterosexual nature, does not make this mistake: his sonnet is addressed "To Mrs. Nightingale."

Oft have I heard your husband's loud display,
dog-whistles, jug-jugs, tense high notes and deep,
like one who when pubs close prevents the sleep
of those who've toiled. It's adolescent May
and that lad April, they're the friends who keep
him up at night and make him sing and play.
It is so hard on you, dear hen, who lay
those olive eggs at which you fondly peep.

Man is the boaster, man the braggart child
with medals, orders, priestly posturings
and tries to justify these cravings wild
with ceremonial what-nots and with kings.
But then we love him for these very things—
we weave and work and womb, but we're so mild!

At present I am holding off with the gentian violet—might get something worth printing.

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Public Health

Imported Smallpox

THE large-scale repatriation from the Near and Far East now in progress involves a temporarily increased risk to our civil population from the importation of smallpox. The coming extensive development of air travel is likely to add considerably and perhaps permanently to the difficulties of smallpox prevention in countries like our own which have for a long time enjoyed an almost complete freedom from this disease. The routine precautionary measures which have hitherto served us fairly well are likely from now on to be severely tested.

The introduction of smallpox into this country by means of infected raw material or merchandise is very rare indeed. The main danger is from recognised or unrecognised human cases who happen to be at an infectious stage of their illness. The sea voyage from the Far East is a long one, exceeding in duration the usual 10–12 days' incubation-period of smallpox, and this constitutes an important barrier to the importation of human cases, particularly of the major Asiatic variety. Not uncommonly, however, ships from the Far East arrive at British ports with a recognised case or cases of smallpox on board. Within a few hours the smallpox patients will have been removed to hospital; medical inspection and vaccination or revaccination of passengers and crew will have been completed; and the ship's company will be free to disperse to their various destinations. These people are known contacts, and their further supervision for a suitable period is entrusted to local medical officers of health, each duly warned by the medical officer of the receiving port health authority. In the case of Forces personnel there is a similar follow-up through the appropriate Service department. Much tedious work of this kind by local health departments goes completely unrecognised because in most instances nothing further happens. On the rare occasions when spread to non-contacts occurs the adequacy of the measures taken is usually called in question.

Paradoxically, it is often thorough vaccination and revaccination which offers a loophole for smallpox to spread from an incoming ship to the population at large. A well-vaccinated person after contact with a case of smallpox may develop a relatively mild attack of the disease with the eruption in so sparse and modified a form that the correct diagnosis is excusably missed. Such cases can undoubtedly spread infection and are all the more dangerous because the mildness of their own illness imposes little or no restriction on their social activities. There is good reason to suppose that the outbreaks which occurred after the arrival of ships at Gravesend in 1938 and Glasgow in 1942 were caused in this way, and it is also the explanation of the present cases at Grays in Essex.

ARRIVAL DURING INCUBATION-PERIOD

The sea passage, the sea and overland route, or the air journey to the United Kingdom from the Mediterranean and the Near East all take less than 12 days. It is now possible to reach this country by air from the Far East in as little as 2 days or from South America via the United States in less than a week. Medical inspection at seaports or airports offers no protection against entry by these means of persons who are unknown contacts incubating smallpox, and it is possible for them to develop a clinical attack at any time within about ten days of their arrival. There were events of this sort at Mount Vernon, Middlesex, in 1943, and more recently at Camberwell and Hampstead in the London county area. The extent of the spread of infection in such instances depends almost entirely on the prompt recognition of the illness and particularly of the mild attacks in well-vaccinated persons. Provided there is no delay or failure to diagnose the initial case the focus of infection can nearly always be effectively sealed off so that there is no spread beyond the immediate contacts.

A useful aid to the prompt ascertainment of the case imported during the incubation-period is the warning card now issued under the auspices of the Ministry of Health and the Department of Health for Scotland to all passengers arriving from abroad by short sea passage or by air. This urges the recipient in his own interests, should he fall ill within 21 days of his arrival, to consult a doctor and hand him the card, drawing his attention to the reminder on the reverse side that the patient's condition may possibly be an infectious disease with a long incubation-period extending beyond the duration of his recent journey. Typhus fever and smallpox are specifically quoted on this card as instances of diseases likely to be encountered in this way. The practitioner is requested, if he suspects such a disease, to get into touch with the local medical officer of health as soon as possible. In cases where a diagnosis of smallpox may be doubtful or difficult it is possible for the medical officer of health, with the doctor's consent and at the expense of the local authority, to obtain a consultant opinion. In England panels of consultants have been set up for this purpose on a regional basis, and contact with them can be made through the Ministry's principal regional medical officers.

The current procedure throws the onus of initial action on the traveller himself and relies on an appeal to his natural concern for his own well-being rather than on his less certain interest in the health of others. This procedure is probably sound as far as it goes—indeed, it would be hard to devise anything more effective without imposing at least two weeks' quarantine on all arrivals in this country from abroad, including those from the Continent. It may be argued that from now on such a quarantine ought to be imposed, with the proviso that exemption could only be obtained by producing on arrival a certificate of successful vaccination or revaccination at least 14 days and not longer than 3–4 years before the start of the journey.

DIFFICULTIES OF CONTROL MEASURES

This measure would give rise to many difficulties, prominent among them being the definition of successful revaccination. Except by serological tests not at present generally available there seems to be no way of demonstrating immunity to smallpox other than by observing for a week the results on the human skin of insertions of a potent vaccinia lymph. Marsden [1] holds that the only type of local reaction indicative of immunity is "a red deep-seated indurated swelling beneath the seat of inoculation developing about the third day and subsiding gradually." Others, quoted by Parish,[2] are prepared to accept "a papule reaching its maximum in 8–72 hours and seldom going on to vesiculation." It seems to be agreed that failure to obtain one or other of these reactions to revaccination indicates either lack of potency of the lymph used or a defect in the technique of insertion. It would be necessary therefore for a certificate of successful revaccination to guarantee the observation of a subsequent local reaction of a particular kind as well as the performance of the operation of insertion. Experience suggests that the maximum success of revaccination is not readily obtainable in tropical and subtropical climates where the preservation of lymph potency depends on careful storage in refrigerators and so on.

Another formidable difficulty is presented by the mild type of case, which, at Gravesend in 1938, and elsewhere since then, has occurred in people whose immunity is presumably as high as present methods of vaccination

1. Marsden, J. *Med. Pr.* 1942, 208, 107.
2. Parish, H. J. *Brit. med. J.* 1944, ii, 781.

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and revaccination can make it. It is of course possible that inoculation with the strains of vaccinia virus now in use cannot produce complete insusceptibility to smallpox, especially when exposure is of the direct and intimate type inevitable among those nursing or treating the smallpox patient. If so, the present position is disturbing, and seems to warrant search for a strain of vaccinia which will produce a more complete protection.

A SOLUTION ?

Not more than 35–45% of the children born in the British Isles are primarily vaccinated in infancy. Revaccination at school age or later is exceptional unless there is known contact with smallpox or a local prevalence of the disease. When mass vaccination and revaccination is undertaken in the face of an epidemic position, as at Glasgow in 1942, the high proportion of primary vaccination at ages other than infancy is thought to increase the risk of the nervous and other complications of vaccinia.

If, as seems likely, it proves impossible to prevent the frequent importation of smallpox in future, the arrangements for infant vaccination and the obsolete machinery of the existing Vaccination Acts must clearly be overhauled. It would be a bold step to place vaccination against smallpox on the same voluntary basis as immunisation against diphtheria, making lymph available at the public expense to every doctor in the country; but such a measure, accompanied by suitable education of the public on the lines of the campaign against diphtheria, would probably be more effective than the present compulsion.

More Cases at Grays and on Shipboard

The cases of smallpox at Grays, Essex, now total seven, with two deaths. Four are in a direct chain—the R.A.M.C. orderly who brought in the infection from his ship, his two nephews, and the sanitary inspector who dealt with his bedding and has since died. A woman living 300 yards from the nephews' home developed smallpox so mild that she did not seek medical attention. Her husband has died with hæmorrhagic smallpox, and her mother, who nursed her during her illness and then returned home to Stanford-le-Hope, has a mild attack of the disease. There is no known link between these two groups of cases, but the proximity of the affected houses makes direct spread a probability.

The liner *Duchess of Richmond* had four men with smallpox on board when she reached Liverpool from Bombay with 3800 passengers, mostly Service men just demobilised or on leave, on March 2; three were R.A.F. men and the fourth a soldier. The *Georgic*, which arrived in the Mersey from Bombay on the same day, had one suspected case among the 5000 troops on board (3000 R.A.F.; 2000 Naval ratings). The Service men from both ships are being sent to quarantine camps for 14 days. Some 30 civilian passengers from the *Duchess of Richmond*, after vaccination, are being allowed home in the usual way, the M.O.H.s of their districts being informed.

Births and Deaths: Figures for Last Year

A decline in births but new low records in stillbirths and death-rates in England and Wales are recorded in provisional figures for 1945 issued by the Registrar-General.

Births.—A total of 685,544 live births represented a rate of 16·1 per 1000 population. This compared with 744,843 live births and a rate of 17·5 in 1944; while the rate in 1945 was 0·1 lower than in 1943. As the fall in the births began towards the end of the first quarter of last year, it may be associated with the heavy exodus of Service personnel from this country following D-day in 1944.

Stillbirths.—Representing 2·8% of total births, the rate was 0·46, the lowest ever recorded, being 0·04 below that of 1944, the previous lowest.

Deaths.—A total of 487,916 (including non-civilians) gave a new low record rate of 11·4, or 0·2 below that of 1944. The previous lowest was 11·5 in 1942.

Figures are also given for the quarter ended Dec. 31 last.

Live births numbered 164,370, giving a rate of 15·3. This was 1·4 below that of the corresponding quarter of 1944, but was 1·2 above the average for similar quarters in the five years before 1944. There were 4699 stillbirths, representing 2·8% of the total births registered. The rate of 0·44 was the same as for the September quarter, which was the lowest ever recorded in any quarter.

Deaths totalled 121,860, making a rate of 11·3, which was 0·3 below that of the same period a year earlier, and 1·0 below the average for the fourth quarters from 1940 to 1944.

In tabular form the figures are as follows :—

—		Live births		Stillbirths		Deaths, including non-civilians	
		Number	Rate per 1000 population	Number	Rate per 1000 population	Number	Rate per 1000 population
4th quarter	1945	164,370	15·3	4699	0·44	121,860	11·3
	1944	178,237	16·7	5111	0·48	123,335	11·6
Year	1945	685,544	16·1	19,418	0·46	487,916	11·4
	1944	744,843	17·5	21,212	0·50	492,176	11·6

Isolation of a Hospital

On Jan. 21 a boy was admitted to the Essex County Hospital, Wanstead, where he was found to be suffering from typhoid fever. He was transferred to the Isolation Hospital, Waltham, but some days later two nurses reported ill with symptoms suggestive of typhoid and these also were transferred to the isolation hospital. Steps were taken to minimise the risk of infection, and visiting of patients was temporarily suspended. In addition, all admissions to, and discharges from, the hospital were stopped. Certain reports appearing in the daily press, however, greatly exaggerated the precautions. One reporter went so far as to say that food and medical supplies were being taken into the hospital on ropes. This idea presumably arose because building is in progress at the hospital in connexion with the new maternity department and the usual arrangements of ropes and pulleys are to be seen outside this block.

Infectious Disease in England and Wales

WEEK ENDED FEB. 23

Notifications.—Infectious disease: smallpox, 1 imported case at Liverpool; scarlet fever, 1307; whooping-cough, 1632; diphtheria, 510; paratyphoid, 4; typhoid, 7; measles (excluding rubella), 1587; pneumonia (primary or influenzal), 1125; cerebrospinal fever, 71; poliomyelitis, 4; polio-encephalitis, 1; encephalitis lethargica, 2; dysentery, 406; puerperal pyrexia, 171; ophthalmia neonatorum, 64. No case of cholera or typhus was notified during the week.

The number of service and civilian sick in the Infectious Hospitals of the London County Council on Feb. 20 was 1026. During the previous week the following cases were admitted: scarlet fever, 59; diphtheria, 37; measles, 39; whooping-cough, 22.

Deaths.—In 126 great towns there were no deaths from enteric fever, 2 (0) from scarlet fever, 1 (0) from measles, 6 (1) from whooping-cough, 12 (1) from diphtheria, 52 (7) from diarrhœa and enteritis under two years, and 141 (17) from influenza.

The number of stillbirths notified during the week was 256 (corresponding to a rate of 34 per thousand total births), including 37 in London.

THE annual dinner of the Indian Medical Service is being revived, and will be held at the Connaught Rooms, London, W.C.2, on June 19, when Lieut.-General Sir Ernest Bradfield will preside. Applications for tickets should go to Major-General R. H. Candy, c/o Grindlay & Co. Ltd., 54, Parliament Street, S.W.1.

Dr. G. H. MONRAD-KROHN, professor of medicine at Oslo University, is one of six Norwegian scientists visiting Britain under the auspices of the British Council. The party will tour the provinces and Scotland between March 3 and 13.

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Letters to the Editor

CHALLENGE TO THE MEDICAL ACT

SIR,—At the second reading in the House of Commons of the National Insurance (Industrial Injuries) Bill on Feb. 18 a number of Socialist back-benchers proposed an amendment to clause 85 in which a definition was given that the term "medical practitioner" used in the Bill "means a registered medical practitioner." The amendment sought to insert at the end of that description the words "or such person or class of persons as the Minister may prescribe"; and "the Minister," the clause states, "means the Minister of National Insurance."

The effect of this amendment would have been to transfer to the Minister of National Insurance that part of the function of the General Medical Council entrusted to it by the Medical Act of 1858, which made the council "the sole authority to determine those persons who could be regarded as having undergone an adequate professional training to practise medicine." The official list kept by this body, known as "the Medical Register," contains "the names of those persons, and only of those persons, who have fulfilled the conditions and training demanded." The purpose of this office performed by the General Medical Council is to protect the public by giving it knowledge of persons who have the qualifications to practise medicine.

The amendment would have the effect of entrusting the temporary Minister of National Insurance with the responsibility of making decisions now made exclusively by a statutory body with nearly a century of experience behind it, consisting of persons having a special and direct knowledge of the practice of medicine in its various branches, as well as of lay persons appointed by the Privy Council.

The motion was disallowed by the Speaker as covering ground which had been previously dealt with. But at the third reading the Member who had taken the initiative in proposing the amendment, undeterred by his failure, pressed the Minister to reopen the question. The Minister met this request with the rather ominous suggestion that the proposal would be more appropriately made in the consideration of the new Health Bill so soon to make its debut in the House of Commons.

A similar power to that sought by the motion cited was given to the Minister of Health by a clause slipped into the Nurses Act, 1943, by which he could "authorise the use by specified persons of specified names or titles containing the word 'nurse'" (vide section 6). By Statutory Order no. 638, May 31, 1945, the Minister, taking advantage of that clause, made a regulation authorising the recognition of so-called "Christian Science nurses" on an equality with registered nurses. The nursing profession is in proper revolt against this development; and when the matter came under debate (*Hansard*, Oct. 17, 1945) it was freely stated that this obnoxious regulation was one explanation of the present critical shortage of nurses. This precedent should surely be a warning to the medical profession and to the public.

To throw the Medical Register open to any person or persons whom a Minister, having no personal knowledge or experience of medical training, might regard as qualified for admission to it, would be to introduce chaos such as prevailed before the enactment of the epoch-making Medical Act, 1858.

House of Commons,
London, S.W.1. E. GRAHAM-LITTLE.

ANOXIA AND RENAL FUNCTION

SIR,—The article by Maegraith, Havard, and Parsons in THE LANCET of Sept. 8, 1945 (p. 293), aroused considerable discussion in your columns and elsewhere, and for this reason alone will probably do much to further our knowledge of renal function.

In suggesting that a common cause underlies the functional renal failures which may complicate so many different diseases they have attempted to put down on paper a matter which has been occupying our attention for at least 12 years. We have, however, never convinced ourselves that all the renal failures we have observed had the same pathological background. Maegraith and his colleagues have incriminated anoxia. But it is difficult to see why anoxia alone should bring about a fall in the physical process of glomerular filtration, and if anoxia is the underlying cause of the functional renal failure why should the syndrome be encountered in uncompensated alkalosis? In this condition, as met with in clinical practice, there need be no hæmoconcentration, no disorganisation of the circulation, and no fall of blood-pressure. Why therefore should there be any reduced oxygen supply to the kidney, and, if the alkalosis itself is held to interfere with the utilisation of oxygen by the tubules, why should there be a fall in the glomerular filtration-rate?

The authors themselves are clearly in a difficulty about the cause of the renal failure in alkalosis, and their own admirable, if limited, work on the subject has not helped them to clarify the matter. The retention of sodium, which they record experimentally (*Lancet*, Dec. 1, 1945, p. 761), is difficult to explain in the presence of a glomerular filtration-rate twice as high as normal. When, moreover, they have to postulate "alterations in renal hæmodynamics so that the blood-flow favours the glomeruli at the expense of the tubules" and a "redistribution of blood-flow through the kidney" to explain the increased glomerular filtration-rates which they observed in the early stages of experimental alkalosis, it is difficult anatomically to visualise such changes in the mammalian kidney, in which the tubules have no separate blood-supply. An alteration in the glomerular membrane or a fall in the colloidal osmotic pressure of the plasma would seem to be much more reasonable explanations of the rise in glomerular filtration-rate. Without wishing, therefore, in any way to belittle the contribution of Maegraith and his colleagues of the Army Malaria Research Unit to renal physiology, we believe it is not yet time to try to find a single explanation for this interesting and widespread syndrome. One may yet be found; but at this stage we prefer to keep an open mind as to cause, and to concentrate on the collection of facts.

Department of Experimental Medicine,
University of Cambridge. R. A. MCCANCE.
D. A. K. BLACK.

CHEMOTHERAPY OF THE COMMON COLD

SIR,—Searching the literature for experiments on insufflation of the sulphonamides into the nose to alleviate acute coryza we found that since Delafield, Straker, and Topley [1] described their trial of antiseptic snuff in 1941, six papers had been published dealing with over 700 such treatments with no greater complication than a transient local skin rash in three patients. Macro- and micro-crystals had been used and dosages from as high as "... a thick chalky film ... covering the nasal mucous membrane and laryngo-pharynx ..." down to "0·3 g. daily for three days." One experiment involved blowing the powders into the trachea.

Pressed for time, and with only one insufflator, we decided to use macrocrystalline sulphathiazole with men under battle training who reported sick with a cold without other signs of infection. One puff of powder was directed up each nostril thrice daily for three days and for a further two days if symptoms had not abated. By careful weighings it was found that each puff delivered 0·09 g. The total treatment therefore averaged about 2·0 g. We were unable to do a control group with inert powder. The presence or absence of the following clinical points was noted before, during, and after treatment: temperature, headache, nasal blockage, cough, earache, sore throat, the amount of nasal discharge, and the loss of smell (tested by bottled scent). In seven weeks 77 men were treated. No special effort was made to retain the powder in the nose.

From our own experience and patients' reports the nasal congestion was lessened in about an hour and ability to breathe through the nose at night was felt as a considerable relief. Of the 77 men treated, 72 remained on duty; 5 had temperatures of 99° F and were put to bed, but lost their symptoms and returned to duty in less than five days. Among the 72 on duty, 10 had five days' treatment before losing their symptoms; the rest had three days' treatment. One exception was a man who developed a septic finger and was not free from symptoms after seven days' treatment. Three patients had labial herpes and one developed this after three days' treatment. No complications ensued in any patient.

1. Delafield, M. E., Straker, E., Topley, W. W. C. *Brit. med. J.* 1941, i, 145.

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On the whole it was felt that some benefit had been conferred by the treatment without shortening the duration of catarrhal symptoms very dramatically. Most of the patients said that they felt very much better in 48 hours and that the symptomatic relief was greatest with nasal blockage and with the discharge, which diminished in volume, often quite dramatically, as with our own colds. Fifty patients lost their sense of smell, presumably from the accumulation of mucus over the smell areas; smell returned in three days, or sometimes earlier.

Meadley and Barnard,[2] using penicillin in sulphathiazole as a snuff for a different purpose, suggest its use in coryza or influenza to reduce secondary bacterial invasion. Our results support their suggestion, though we have not supplied the controlled clinical trial which they rightly require. So far as we can discover no adequately controlled investigation has been done along these lines.

It seems that for the present the best advice the profession can offer the sufferer from a common cold is that he should arm himself with the "small bottle" described by Meadley and Barnard and at the first sign of a cold charge it with sulphathiazole powder containing 10,000 units of penicillin per g. (if he can get it), go to bed for twenty-four hours (if he can), and sniff as much powder as will go on an old-fashioned threepenny-piece up each nostril four-hourly.

The more elaborate powder-spray method, though very effective with little children, is likely to be confined for the present to the doctor's family.

Ely, Cambs. K. HAZELL.
Berkhampsted, Herts. J. F. BUCKMASTER.

CONGENITAL DEFECTS FROM GERMAN MEASLES

SIR,—All will agree with the scheme of investigation proposed by Prof. Leonard Parsons in his letter of March 2; it is essential to place this problem on a sound etiological and statistical basis. Although there is, as your leader of Feb. 9 shows, a strong prima-facie case for it, I may add, by personal communications from Dr. F. V. Scholes of Melbourne, an epidemiologist of high repute, who is convinced of the sequence as the result of his observations during and following a widespread epidemic of rubella in Australia), it is nevertheless necessary to establish that post hoc is indeed propter hoc. To do this requires analyses of statistically significant series of controls, as Professor Parsons suggests. But this is only one aspect of the problem. We have no precise knowledge of the ætiology and no knowledge at all of the immunology of rubella, hitherto regarded as a trivial disease, frequently confused by the way with mild measles or scarlet fever. Hence, in parallel with observations in the field, it is necessary in my view to conduct appropriate laboratory investigations with a view to providing efficient specific means of protection for the woman exposed to rubella and/or other virus infections in the early stages of pregnancy.

London, N.15. E. H. R. HARRIES.

*** As soon as a preliminary inquiry among deaf and blind children has established the existence of an association between congenital defects and German measles in this country (and the inquiry being made by S. M. Martin [3] may be said to have established it already), all practicable measures for preventing further defects from this cause should be applied at once; and if these prove effective subsequent inquiries into incidence will be invalid. The urgent need, as Dr. Harries urges, is for research into the efficacy of convalescent serum, gamma globulin, or other agents against German measles.—ED. L.

DANGEROUS NASAL CARRIERS

SIR,—Your leading article of Feb. 2 draws attention to two common infections, streptococcal disease and diphtheria, spread by droplets. It would be interesting to have the views of your readers about the spread of other diseases by this method. For example, blastomycosis, due either to a torula or a blastomyces (i.e., the two deadly forms of blastomycosis), may start as a nasal infection; I have seen two patients with the disease, both with at one time symptomless nasal ulceration, who were perhaps a potential source of fatal infection.

One of them, a woman of about 50, will be the subject of fuller discussion elsewhere; she has American blastomycosis, of which few examples are reported in this country. Her skin responded well to painting with iodine, bathing with aspirin solution, fractional doses of X rays, and internal medication with iodides, salicylates, and mercury. Unfortunately the nasal infection has led to a mycotic lung infiltration, of which there are no symptoms apart from tachycardia and very slight pyrexia. This may respond to gold injections, which are being given, on my suggestion, by Dr. R. A. Hooper of Torquay, who is in charge of the patient. She has also had X-ray treatment of the lung from Dr. B. T. Halliwell of Torquay. The nasal condition is being treated by Mr. W. H. Bradbeer, who does not find any danger of infection from the nose at present.

There are other dangerous nasal carriers whose nasal infection is never considered since other signs of disease strike the eye. I have in mind the patient with the not-yet-rare but definitely uncommon condition, secondary syphilis.

Exeter. H. W. ALLEN.

ADAPTATION OF E.M.S. HUTS

SIR,—I should be glad of an opportunity of endorsing the praise given in your last issue (p. 314) to the enterprising plans of T. S. McIntosh and H. R. Coates for adapting E.M.S. huts to peace-time hospital purposes. The plans will be of great interest to that increasing army of medical men concerned with hospital construction and will provide a useful pattern for all adaptations to open wards.

In general I dislike adapted hospital buildings, but I wholeheartedly support the policy of doing something to existing hospitals or huts until new ones can be constructed, even if the altered buildings are to last for as short a time as 10 years. The well-known danger of hanging on to temporary or adapted buildings for four, five, or more times the period for which they were intended must be guarded against.

For years I have accepted the principle implied in these plans that the day of the long open ward is past. Although the plans of chronic sick and tuberculosis wards include 20- and 16-bed units, in general the tendency has been to divide wards into 2-, 4-, 6-, or 8-bed units with a liberal provision of single rooms. Let me add that I think it would be psychologically unsound to dispense entirely with multi-bed wards. The division I prefer is into single rooms and 4-bed units. The reasons for such division are two: avoidance of hospital infection and increased privacy for patients. In the case of children the only factor is cross-infection. For this reason the planning of children's cubicles on both sides of a long central corridor is not entirely satisfactory; but if adequate electrical services are provided, it should be possible in special situations to offset these structural deficiencies by the installation of apparatus for aerial disinfection by germicidal ultraviolet radiation or aerosols. Other places where aerial disinfection would be of particular value are operating-theatres, labour wards, and (a pet project of mine) dressing-and-treatment rooms in all surgical wards.

It can be said with confidence that in almost every hospital today the proportion of floor space devoted to ancillary accommodation is quite inadequate. In the plans provision is made for an increase in the size and number of ancillary rooms in wards. Small ward units and ancillary rooms can only be obtained in existing buildings at the expense of beds. The loss must not be regarded as unfortunate but as essential and desirable. The tendency in adapted buildings—and in new ones too—is to spoil the ship for a ha'porth of bed accommodation. This tendency has been largely avoided except in the plans for emergency tuberculosis wards. I should like to make a plea for two other types of ancillary accommodation—the examination-room and, in surgical wards, the dressing-and-treatment room mentioned above. These rooms should communicate directly with the ward by double doors so that a patient in bed can be wheeled in. This could be accomplished by incorporating into surgical wards some of the features

2. Meadley, R. G. S., Barnard, H. F. *Lancet*, Jan. 19, 1946, p. 87.
3. *Brit. med. J.* 1945, i, 855.

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included in maternity wards. The plans make no distinction between medical and surgical wards, which I think is a mistake. In the dressing-and-treatment room dressings could be done under conditions of asepsis and aerial disinfection not possible in the ward itself. From experience of examination-rooms I can state that they allow the medical officer to examine without being disturbed and they prevent that interference with the routine of the ward which the presence of an examining medical officer inevitably brings—important considerations in these days of staff shortages. If these rooms are to be used for dual purposes I suggest the examination-room could be combined with the duty-room or the ward office or a room which appears in some plans—the reception-room. In surgical wards the examination-room might be combined with the dressing-and-treatment room, but I prefer them to be separate.

Other features I like are a liberal provision of wash-hand basins, sluice-rooms with wash-hand basins and dirty-linen exits, and entrance and exit doors to ward kitchens. I regret showers on the pattern of the American hut have not found favour; to soak in a bath-tub in a warm, dilute solution of all secretions from the uppermost to the nethermost orifices may be pleasant but is not the most hygienic method of ablution, particularly if several others have been in the tub previously.

Engineers' plans are not so often available to medical men as architects' plans, although it is my experience that engineers require more guidance on the medical implications of their work than do architects. Engineering costs may be heavier than the cost of structural alterations if cheap materials for partitions become available. I would plead for as much foresight and generosity in engineering works as has been shown in architectural features if the results are to be worthy of the spirit of enterprise shown in these plans.

Joyce Green, Dartford, Kent. M. MITMAN.

SMALLPOX FROM RETURNING SERVICE MEN

SIR,—Your correspondent "Sadder but Wiser" (March 2) advocates vaccination of relatives of men returning from areas where smallpox is endemic. Is the profession aware, however, of the laissez-faire attitude of the public-health authorities?

I have just returned from Colombo, via Bombay, and on Feb. 18, 13 days from the latter port, a soldier on the ship developed smallpox. He was put ashore at Gibraltar next day and all the passengers and members of the crew were vaccinated on arrival at Southampton on Feb. 23. We were all allowed ashore on that or the next day.

I was eagerly looking forward to seeing my month-old son. But he had not been vaccinated; so I am now leading a secluded life with my parents. Had I not been a doctor I would probably have dashed off to see my wife and son, possibly with disastrous results, for no official advice was given to fellow-passengers.

I wonder what those 2500 contacts are doing? I doubt if any are taking the precautions that have been forced on me. Perhaps we shall soon see.

DISAPPOINTED.

*** The present precautionary measures are discussed in our Public Health section.—ED. L.

JOURNALS FOR HUNGARY

SIR,—In Hungary there is apparently a great dearth of current literature dealing with English medicine, and a correspondent asks us whether we can devise any means of supplying copies of *The Lancet*. It seems that it is not possible to expect payment, but it occurs to me that some of your readers may be moved to answer this appeal by passing on any copies which they do not habitually file. If they could do this service it would be greatly appreciated by their colleagues in a country which has always—notwithstanding the sundering influences of war and inept political allegiances—maintained a great admiration for British methods, and the gesture would be of service in restoring friendly contact with a land with which diplomatic relations have lately been resumed.

I shall be glad to transmit any copies sent to me for the purpose.

EDWARD FULLER,
Editor, *The World's Children*.

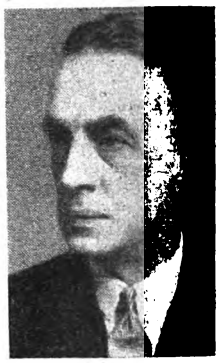
20, Gordon Square,
London, W.C.1.

Obituary

SYDNEY GRAY MacDONALD

M.A., M.B. CAMB., F.R.C.S.

Mr. MacDonald, who died on Feb. 20 after a short illness, had only recently retired from active work as a urologist. Born in 1879, the eldest son of Eben. MacDonald of Sydney, New South Wales, he was educated at St. John's College, Cambridge, and at St. Thomas's Hospital. On qualifying in 1906 he became house-surgeon at St. Thomas's Hospital, and later, as a foundation for his future specialty, senior house-surgeon at St. Peter's Hospital for Stone and other Urinary Diseases. He took the F.R.C.S. in 1909, and in 1912 he was appointed surgical registrar at the West London Hospital, where he became assistant surgeon in 1915. In 1920 a separate genito-urinary department was formed at the hospital, and MacDonald had charge of it until his retirement under the bye-laws in 1939, when he was appointed consulting genito-urinary surgeon. He was also genito-urinary surgeon to the Royal Masonic Hospital and to the Chelsea Hospital for Women, and held office as president of the urological section of the Royal Society of Medicine. He was a fellow of the Association of Surgeons, a foundation member of the British Association of Urological Surgeons, and a member of the International Society of Urology. His publications included chapters in Latham and English's *System of Treatment*, in Fairbairn's *Encyclopædia of Midwifery*, and in Walton's *Textbook of Surgical Diagnosis*. His large and successful practice left him little time for recreations, but these included golf and shooting, and he was a keen supporter of masonry.



Elliott & Fry

A. E. R. writes: "MacDonald was quick in thought, speech, and gait, and direct, simple, and honest in all things, while his friendships were lasting and loyal. Indeed, to those who did not know him well, the rapidity and conciseness of his diction sometimes resulted in apparent brusqueness which, however, was so mingled with kindliness as to be incapable of offending any but the pompous. His rapidity and decisiveness were carried over into diagnosis and treatment, being responsible for the uncanny speed with which he made up his mind about a case (and he had a way of being right in his conclusions), and also for his operative successes. As a surgeon, he was a bit of a lone wolf, not following the crowd or carried away by academic considerations or fashionable operations, but guided by his own sure instinct and the techniques which he had personally found suitable and successful. MacDonald's death leaves a big vacuum both in the urological world and in the hearts of his many friends, who would wish to offer their respectful sympathy to his widow and daughters."

JOHN DAVIS BARRIS

M.B. CAMB., F.R.C.P., F.R.C.S., F.R.C.O.G.

Dr. John Barris died at St. Bartholomew's Hospital on Feb. 23 after a short but acute illness. He fought this with the same fortitude and will-power as characterised all his actions when he was fit and well.

Born in 1879, he went up to Caius College, Cambridge, in 1898 to study medicine and take an honours degree in arts. He then entered St. Bartholomew's Hospital and qualified in 1905, being awarded various prizes, including the Shuter and Luther Holden research scholarships. He was house-surgeon in the department of obstetrics under Sir Francis Champneys and Dr. Griffith, and obstetrical tutor from 1909 to 1913, and was then elected to the full staff of the hospital.

Barris was a fine teacher, and his rounds and lectures were always well attended. He was a most careful and clever diagnostician, a beautiful, methodical, and deliberate operator. He became senior physician-

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accoucheur in 1925 and retired at the age limit in 1939. During the 1914–18 war he served with the R.A.M.C. in France and as soon as the second German war began he volunteered to work and teach at the St. Albans base hospital. By carrying on this work until the summer of 1945 he missed six years of leisure which he well deserved.

A member of the obstetrical and gynæcological section of the Royal Society of Medicine, he was invited to be president of the section in 1938 but refused. He was joint author of the two volumes of Ten Teachers' *Midwifery* and *Gynæcology* and other text-books. He had a very busy life, for apart from his practice he took a keen interest in the medical college of St. Bartholomew's Hospital and all aspects of student life. His refusal to be upset over any emergency, and his sound common sense and steadiness in a crisis, must have stimulated many Bart's men during their training. Barris was a keen rugby football player, and was president of the hospital club for many years, and most of the best players were his house-surgeons.

In 1901 he married Margaret Morris and they had three daughters. He will be greatly missed by many people but particularly by his colleagues at St. Bartholomew's.

DAVID RORIE

D.S.O., M.D. EDIN.

Dr. David Rorie, who died at his home in Aberdeen on Feb. 18 at the age of 78, had won a reputation among his own people as doctor, poet, and wit. Fellow Scots have carried the best of his songs across the border, and the tune and many of the words of the *Lum Hat wanting a Croon* are familiar to Sassenachs who could not name their author.

Dr. Rorie graduated in medicine at the University of Edinburgh in 1890, and was for ten years in practice at Cardenden in Fife. Here his abiding interest in folk medicine was first aroused, and he described the superstitions and medical lore of the miners and fisherfolk in a series of valuable papers. In the 1914–18 war he served as A.D.M.S. with the 51st (Highland) Division, and was awarded the D.S.O. and the Legion of Honour. After he returned to Cults near Aberdeen, where he had settled in 1905, he remained a good friend to the soldiers for whom he had written marching songs in France, and from 1930–35 he was honorary colonel of the R.A.M.C. units of his old division. He also took a prominent part in the work of the Aberdeen branch of the British Legion. In *A Medico's Luck in the War* (1929) he gave a vivid picture of these strenuous years. His book of verse *The Auld Doctor* had already appeared in 1920, and members of the Aberdeen Medico-Chirurgical Society will remember his witty speeches in verse after their dinners.

Since 1912 Rorie had been joint editor of the *Caledonian Medical Journal*. Though he retired in 1933, during the late war he acted as chairman of the Aberdeen medical board for recruitment, and he was a J.P. for the counties of Fife and Aberdeen. He married Margaret Elizabeth, daughter of the late Dr. J. W. Miller of Dundee, and they had a son and a daughter.

In the *Aberdeen Press and Journal* of Feb. 23 A. K. writes of Rorie: "To many who knew him not or only slightly he was the facile humorist because he had the knack of writing witty verses, but like most humorists he was a man of profound wisdom and a penetrating knowledge of the human heart. . . . He was a big enough man to laugh at life. He loved laughter and life both, but he knew too much to be beguiled by the music of a distant drum."

JOHN GEORGE PORTER-PHILLIPS

M.D. LOND., F.R.C.P.

Dr. Porter-Phillips died on Feb. 24 only fourteen months after his retirement from over thirty years' work as physician-superintendent of Bethlem Royal Hospital. He joined the staff of that hospital as a house-physician in 1907, the year in which he qualified, and his whole professional life was lived there.

Born at Darjeeling in 1877, son of the late Robert Phillips, he was educated at Brighton, University College, London, and Guy's, gaining the Gaskell gold medal and prize in psychological medicine at U.C.H. in 1911. He became physician-superintendent of Bethlem and Bridewell in 1914, but by no means confined his attention to his own hospital, being at various times medical officer to King Edward's School in London and at Witley; physician to the Hospital for Nervous Diseases, Lambeth; examiner in mental diseases at the Royal Army Medical College; lecturer in mental pathology at the London School of Medicine for Women; and for many years physician and lecturer in psychological medicine at St. Bartholomew's Hospital. He also examined for the diploma in psychological medicine. He wrote on a wide range of psychiatric subjects, and in the intervals of a busy life found time to be interested in golf, fishing, natural history, and art. He was a member of the Savage Club.

When Bethlem Hospital was in Lambeth it was a centre for psychiatrists, although the name was not yet popular. Medical students received training there, and for a few years a course of lectures for the diploma in psychological medicine was held. Porter-Phillips, or "P. P." as he was called, was a genial host, and always welcomed visitors to his hospital most warmly. He had a charming manner and his courtesy impressed all who met him. In 1930, when the new hospital was opened at Beckenham, he was very proud of its modern improvements. When it was proposed that the opportunity be taken to change the name of the hospital because of the unhappy connotation of Bedlam, he defended retaining the old name and announced that, since admission is there restricted to early and curable cases, the new slogan should be "Bethlem means curable."

Dr. Porter-Phillips leaves a widow, a son, and two daughters.

UPENDRANATH BRAHMACHARI

KT., M.A., M.D., PH.D. CALCUTTA

By the death of Sir Upendranath Brahmachari, in Calcutta on Feb. 6, India has lost one of her outstanding figures. He was not only a distinguished Indian physician—perhaps the most distinguished of his day—but also a research-worker of unusual merit. He played an important part in the public life of India, particularly of Calcutta, without at any time becoming involved in politics. He had no racial prejudices: his friends might be British, Indian, or American; for to Brahmachari they were primarily fellow scientists sharing with him service to mankind.

He was born on June 7, 1875, in Jamalpur in the Monghyr, district of Bengal, his father, Dr. Nilmoney Brahmachari, being in the medical service of the East India Railway. He took his B.A. degree from Hoogly College, where he was awarded the Thwaytes medal in mathematics in 1893. In the following year he took his master's degree in chemistry from the Presidency College, Calcutta, obtaining the university medal, and in 1898 he passed the Calcutta M.B. examination, standing first in medicine and surgery. He graduated M.D. in 1902 and PH.D. in physiology in 1904. Immediately after qualifying, he entered the Bengal Provincial Medical Service, and at an early age was appointed teacher of pathology and materia medica at the Dacca Medical School. Later he became lecturer at the Campbell Medical School in Calcutta, a post that he occupied for nearly 20 years. When he retired from the Provincial Medical Service he was made visiting physician at the Medical College Hospital in Calcutta, and professor of tropical medicine at the Carmichael Medical College. In Calcutta University he was a fellow for over 40 years and a member of the syndicate for over 30. He was president of the Indian Science Congress (1936), of the Royal Asiatic Society of Bengal, and of the Indian Chemical Society. The many medals given him for his scientific work included the Minto medal of the Calcutta School of Tropical Medicine, for his "valuable contributions to malaria, kala-azar, and other subjects." Of official honours he received the Kaiser-i-Hind gold medal, the title of rai bahadur, and finally a knighthood.

Probably Brahmachari's chief contribution to medical science was his discovery of urea-stibamine, one of the

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first of the successful drugs used in the treatment of kala-azar—a disease that only a few years previously had a reputation for being fatal in 95% of cases. Although it is about 25 years since he introduced this drug, it is still employed extensively, and is thought by some to be the most valuable remedy for this disease. He was also the first to draw attention to an interesting dermal sequel to kala-azar, which he called "dermal leishmanoid." His early researches on antileishmanial drugs, which culminated in his preparation of urea-stibamine, were financed by the Indian Research Fund Association. Later, however, he was in the fortunate position of being able to finance his own investigations, and until the end he maintained an active interest in medical research problems, especially those with a chemical aspect. In his laboratories he gave employment and encouragement to many young Indian chemists.

In his large house in Calcutta Brahmachari delighted to entertain his British and Indian friends. The fare was always good and the conversation even better. If all distinguished Indians, and for that matter all British officials, had shared his liberal outlook, many of the difficulties of India today would have been solved before they had time to develop.

WALTER SPENCER ANDERSON GRIFFITH

C.B.E., M.D. CAMB., F.R.C.P., F.R.C.S.

Walter Griffith was born in 1854, and was educated at Brighton College, where his father, the Rev. John Griffith, was headmaster. He studied medicine first at the Royal Sussex County Hospital in Brighton and secondly at St. Bartholomew's Hospital, whence he qualified as M.R.C.S. in 1878. His Cambridge degree was gained in 1885, when he had managed to combine work in London with the necessary number of days' residence at Downing College. He became in due course tutor in midwifery at Bart.'s but did not reach the position of assistant physician-accoucheur there till 1890, having meanwhile gained honorary appointments at three other hospitals—the Samaritan, the Great Northern, and Queen Charlotte's—the last of which he retained. Taking the F.R.C.S. in 1881, he was elected F.R.C.P. in 1893, and by his teaching and a certain amount of writing he had secured an influential place in his specialty before the turn of the century. He was also president of the Medical Defence Union.

T. G. S. writes: "I had the privilege of working with Griffith, first as resident at Queen Charlotte's Hospital in 1894, when he was on the senior staff with Chapman Grigg, and later as a colleague when I was appointed outpatient obstetric surgeon. He changed very little in the years between and remained the strong man with an intensely serious outlook on everything connected with midwifery. He took the greatest pains with everything he did at the hospital, and he did not always agree with his colleagues; nevertheless his point of view was always sound and in the end usually prevailed.

"Griffith was the last survivor of that epoch in medicine when obstetricians were generally called 'physicians' and in many instances were actually physicians who had turned their attention to obstetrics. They performed obstetric operations, including cæsarean section, but in some hospitals, although in charge of gynæcological wards, they were debarred from performing any abdominal operations. Griffith, however, was never of this type; he had the surgical instinct and was an excellent operator. After the retirement of Sir Francis Champneys arrangements at St. Bartholomew's were altered and he took over the abdominal surgery in the gynæcological ward, which I believe up to that time had been done by Harrison Cripps. As an example of Griffith's skill as an operator I may mention that I assisted him with the first symphysiotomy done at Queen Charlotte's for obstructed labour. He performed the operation, which was an open one, with great coolness and dexterity, and delivered the child with forceps; the mother made a good recovery, being able to jump off a chair at the end of three weeks.

"As a teacher Griffith had a great following. His rounds at Queen Charlotte's were a model of what teaching should be; his views were always lucidly expressed, and his dicta were so phrased as to be equally intelligible to pupil midwives and to medical students—a by no means easy task. Although he did not write much himself, he often inspired others to undertake pieces of research and collaborated with them in producing results. At the Royal Society of Medicine in debate he was always impressive; his remarks were very much to the point and delivered in so earnest a manner as always to command respect, if not invariably acquiescence. He encouraged the younger members to speak, and took great interest in any specimens they might show. At his great age and after so many years of retirement it can hardly be said that he will be missed, but it can be affirmed that he will always be remembered as a big strong conscientous man who was a model of everything that an obstetric surgeon should be."

The following tribute comes from an old pupil: "In the early 'nineties when I was nearly 'qualified' to run a general practice, the women's wards at Bart.'s, where Champneys (scholar and organist) had just stepped into Matthews Duncan's big shoes, and Harrison Cripps alone was entitled to operate above the symphysis, were practically closed to the ordinary student, who learned all he knew about childbearing from a fortnight's resident apprenticeship at the sign of the butcher in Smithfield where our extern drilled us on the dummy pelvis and we sallied forth to attend the mothers in that sordid district (who expected it would be twins when two of us came). But twice a week at 'outpatients' we were thrilled by W. S. A. G.'s blunt and practical teaching of the injuries and diseases of neglected midwifery—a fine figure of a man, gentle almost tender with his patients, stern almost relentless with his students. How many successful accoucheurs must date from that crowded room their first insight into the reproductive process in its personal and social aspects, recalling across long years the wisdom and humanity of their old teacher."

Dr. Griffith retired from the active staff of Bart.'s in 1919, having been appointed C.B.E. for his services during the war. He was twice married, in 1885 and 1918, and had a son by his first marriage. He died at the age of 91 on Feb. 26, and a memorial service was held at St. Bartholomew's Hospital last Tuesday.

THE LATE PROFESSOR LORENZ

Prof. Harry Platt writes: "The passing of this world-famous surgical Meister, who dominated the practice of the older orthopædics in Europe in the earlier years of the twentieth century, brings up memories of his powerful and colourful personality, and of his remarkable achievements. Lorenz began his surgical apprenticeship under Eduard Albert at a time when Billroth occupied the second university surgical clinic, and Nothnagel, Fuchs, and Pollitzer were notable figures in the Vienna school of medicine. He was given the opportunity of developing orthopædics within Albert's clinic, and he rapidly became successful in private practice. At that time the crippled and deformed were largely turned over to makers of surgical appliances, who evidently followed an exceedingly lucrative calling, for, as Lorenz himself has recorded, whereas Billroth and Albert walked to their work, the leading instrument-maker of Vienna drove up to the Allgemeine Krankenhaus in an elaborate conveyance drawn by splendid Hungarian horses!

"Fortunately we have no need to delve deeply into medical literature to recall the life and career of Adolf Lorenz, for at the age of 82 he published his autobiography (New York: 1936) in which he appraises himself and his works in the most delightful and superbly egotistical fashion. His name is of course associated with the treatment of congenital dislocation of the hip by bloodless reduction—a procedure which was the foundation of the manipulative technique used today by orthopædic surgeons all the world over. Lorenz lost one fortune by the financial collapse of Austria in 1918, but despite the fact that he was no longer a young man, with great determination and courage he achieved prosperity once more in a number of visits to the United States and elsewhere during the boom period which began in 1921. In his autobiography this chapter is headed The Reconquest of America. He came of humble stock but was endowed with a splendid physique, brains, and a determination to reach the highest position in his chosen branch of surgery."

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Notes and News

MEDICINE AND ART

In a world where, in due course, more people will have less work to do, there will be the great problem of occupying leisure hours satisfactorily. To most medical men, now and for years to come, there will be no difficulty; for we have no spare time. A doctor's crying need is to *make time*—for himself. A hobby is a necessity if he is to keep fresh for his work, and it is wise to have one that will last into days of retirement.

Whatever the shorter Oxford Dictionary may say, "hobby" is not synonymous with "pastime." The Concise Dictionary is more accurate when it describes a hobby as "a favourite subject or occupation that is not one's main business." It must be confessed that for some doctors this occupation has become sometimes the main business. Especially is this true in literature, from Doctor Rabelais to Doctor Bridges and even perhaps to Doctor Mavor. In the world of art there are fewer great names from the field of medicine. Tonks immediately comes to mind, and of course Dr. Thomas Monro who at the end of the 18th century lived quite close to the present *Lancet* office in the Adelphi, and, though not himself an artist, did much to establish the great school of English water-colour painters through his patronage of struggling young men like Tom Girtin and J. M. W. Turner.

Until 1939 there was an active Medical Art Society, and this should be revived; for it is apparent that, through painting, there must be many medical men who thus find solace and re-creation; just as others find it at golf, fishing, gardening, book-collecting, carpentry, model-making, photography, and the like.

This week there has been opened at the Fine Art Society's gallery in New Bond Street, London, an exhibition of the works of the late Robert Worthington of Exeter, a memoir of whose life we published last August. Worthington was one who, in the midst of a busy surgical career, found relaxation in several extramedical activities. Whatever he did, he did well. In one particular, his art, he was outstanding. Besides being a connoisseur and patron of art, he was a distinguished water-colour painter in the great English tradition. He left several hundred drawings—of a quality that might well have been the product of a whole-time artist. And yet they were merely the results of weekend activity. Possibly that is why they have such freshness and breadth.

INTERNATIONAL CONTROL OF NARCOTIC DRUG TRAFFIC

The supervisory body on the limitation of commerce in narcotic drugs, under the convention of 1931, has issued from Geneva the estimate of world requirements of narcotics for 1946. Fifty-seven out of 72 countries and 85 out of 110 territories, parties to the convention, furnished the estimates required; 15 countries and 19 territories having failed to do so. Thirty pages of statistical tables set out the figures for each country and territory in respect of morphine, heroin, cocaine, codeine, ethylmorphine, &c. For the United Kingdom the 1946 estimates are: morphine 1287 kg. for use as such, and 6133 kg. for conversion; codeine 2876 kg.; cocaine 442 kg.; and heroin 28 kg. For the United States the figures are: morphine 2258 kg., and 12,892 kg. for conversion; codeine 11,850 kg.; cocaine 900 kg.; and no heroin. For China: morphine 500 kg., and 750 kg. for conversion; cocaine 60 kg.; codeine 334 kg.; and no heroin. For Japan: morphine 1700 kg.; codeine 1988 kg.; cocaine 890 kg.; and heroin 180 kg. The statistics for Japan were framed by the supervisory body itself. The report calls attention to the fact that the figures for the conversion of morphine for 1946 are largely in excess of those furnished in recent years and urges close examination by the Governments concerned.

Referring to the future relationship of the supervisory body to the United Nations Organisation, the report concludes: "It is of the greatest importance that the work of the supervisory body should be carried on without any gap or any interruption, or the whole system of international drug control may break down."

Royal Institute of Public Health and Hygiene

Sir Alexander Fleming, F.R.S., has been awarded the Harben gold medal for 1946. Dr. J. J. Buchan, M.O.H. for Bradford, has been granted the Smith award for 1946, made to "a medical officer of health who is recognised as having done the most noteworthy work in the discharge of his official duties."

University of Cambridge

An Elmore medical research studentship will shortly be awarded. The studentship is open to male graduates of any university in any country, who were born anywhere in the British Empire, other than Scotland. The student will work in the department of medicine; the commencing salary will be £400 a year, and the appointment will be for two years in the first instance. Further information may be obtained from the regius professor of physic.

On March 1 the following degrees were conferred:—

M.D.—C. M. Heath.

M.B., B.Chir.—D. A. G. Galton, A. C. Arthur, Errington Ellis, J. S. R. Golding, R. H. Ellis, S. M. Hilton (all by proxy); M. D. King.

Royal College of Physicians of Edinburgh

At a quarterly meeting on Feb. 5, with Dr. D. M. Lyon, the president, in the chair, Dr. D. M. F. Batty, Dr. J. Halliday Croom, Dr. G. A. G. Peterkin, and Dr. James Innes (Edinburgh), and Dr. Angus MacNiven and Dr. J. S. Fulton (Glasgow) took their seats as fellows. Dr. B. S. Bindra (Karachi, India) and Dr. O. Olbrich (Edinburgh) were elected to the fellowship.

Society of Apothecaries

On Tuesday, March 12, at 8 P.M., at the hall of the society, Black Friars Lane, London, E.C.4, Lord Moran, P.R.C.P., will deliver a lecture entitled Into Battle.

Institute of Almoners

Sir Ernest Rock Carling will speak at the annual general meeting of the institute, to be held at B.M.A. House, Tavistock Square, London, W.C.1, on Friday, March 15, at 6 P.M.

West London Medico-Chirurgical Society

The society will hold a dinner at the South Kensington Hotel, 41, Queen's Gate Terrace, S.W.7, on Friday, March 15, at 7.15 for 7.30 P.M. Dr. G. S. Hovenden will deliver a presidential address entitled Fifty Years of General Practice.

Award to Colonel Harrison

The American Social Hygiene Association has awarded the William Freeman Snow medal for 1946 to Dr. John H. Stokes, director of the institute for control of syphilis, University of Pennsylvania, and Colonel L. W. Harrison of the Ministry of Health. The presentation to Colonel Harrison was made in London by Sir Wilson Jameson, chief medical officer of the Ministry, at a meeting in honour of the occasion. The proceedings were afterwards broadcast to the New York conference on Feb. 6 at which Dr. Stokes received his medal.

Chelsea Clinical Society

At a meeting of this society held on Feb. 26, Dr. F. Murgatroyd delivered a lecture on The War and Tropical Medicine. He described recent advances in methods of combating tropical diseases under war-time conditions, and explained how their occurrence might affect general medical practice in Great Britain.

Postgraduate Training for Demobilised Scottish Psychiatrists

The Board of Control for Scotland has issued a circular suggesting to authorities of mental hospitals and mental deficiency institutions that study-leave should be granted to demobilised doctors who have rejoined their staffs. Inquiries about facilities for training should be addressed to Prof. D. K. Henderson, Royal Edinburgh Hospital for Mental and Nervous Disorders, Edinburgh, 9. The Board of Control for England and Wales has already issued a similar circular (see *Lancet*, Feb. 16, p. 255).

International Society of Medical Hydrology

At the first post-war meeting of this society, to be held on Oct. 4 and 5 at Buxton under the presidency of Lord Horder, the main subject of papers and discussions will be Hydrology in its Application to the Rheumatic Diseases. Local treasurers of foreign countries are being circulated in order to try to obtain a reunion with colleagues abroad. Practitioners wishing for further information are asked to communicate with the local treasurer for Great Britain, Dr. A. R. Nèligan of Droitwich. The chairman and vice-chairman of the executive committee are Dr. J. Barnes Burt and Dr. G. D. Kersley.

Return to Practice

The Central Medical War Committee announces that the following have resumed civilian practice:—

Mr. H. BURT-WHITE, F.R.C.S., 98, Harley Street, W.1.
Mr. MAXWELL ELLIS, M.S., F.R.C.S., 149, Harley Street, W.1.
Mr. H. G. ESTCOURT, M.B.E., F.R.C.S.E., 97, South Street, Eastbourne.
Mr. E. P. TULLOH, M.B., D.O.M.S., 21, Boscombe Spa Road, Bournemouth.

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On Active Service

AWARDS

O.B.E.

Lieut.-Colonel E. M. HENNESSY, M.B. N.U.I., R.A.M.C.

M.B.E.

Captain T. C. N. GIBBENS, M.B. Camb., R.A.M.C.
Major H. McP. KILGOUR, M.B. Edin., R.A.M.C. (since died).
Major W. M. MACLEOD, M.B. Lond., R.A.M.C.
Captain W. MILBURN, M.B. Lpool, R.A.M.C.
Captain A. P. NORMAN, M.B. Camb., R.A.M.C.
Captain J. E. READMAN, M.R.C.S., R.A.M.C.
Captain N. S. SEAFORD, M.R.C.S., R.A.M.C.
Captain A. F. STALLARD, M.B. Camb., R.A.M.C.
Captain H. T. TATE, M.B. St. And., R.A.M.C.
Captain H. W. WYKES, M.R.C.S., R.A.M.C.

M.C.

Captain ANTHONY CROOK, M.R.C.S., R.A.M.C.
Captain ARNOLD GOUREVITCH, M.R.C.S., R.A.M.C.

MENTIONED IN DESPATCHES

R.A.M.C.

Lieut.-Colonels. — F. J. O'MEARA, T. A. S. SAMUEL, M.C.
Majors. — W. L. KINNEAR, M.B.E., G. G. E. SMYTH, J. M. FOSBROOKE, E. MOORE, S. W. BARBER, M.B.E.
Captains.—J. A. LEARNER, D. J. MACRAE, J. A. S. MULLIGAN, T. M. PARK.
Lieutenant S. T. WILLIAMSON.

Medical Diary

MARCH 10 TO 16

Monday, 11th

MEDICAL SOCIETY OF LONDON, 11, Chandos Street, W.1
8.30 P.M. Mr. Wilson Hey, Mr. W. E. M. Wardill: Benign Enlargement of the Prostate.

Tuesday, 12th

SOCIETY OF APOTHECARIES OF LONDON, Black Friars Lane, E.C.4
8 P.M. Lord Moran: Into Battle.
ROYAL SOCIETY OF MEDICINE, 1, Wimpole Street, W.1
5.30 P.M. *Psychiatry.* Dr. Margaret Lowenfeld, Dr. Alan Maberly: Value of Play Therapy in Child Psychiatry.
UNIVERSITY COLLEGE HOSPITAL MEDICAL SCHOOL, W.C.1
4.30 P.M. Prof. J. Z. Young, F.R.S.: Effects of Use and Disuse on Nerve and Muscle. (Sydney Ringer lecture.)
MIDDLESEX COUNTY MEDICAL SOCIETY
3.30 P.M. (West Middlesex County Hospital, Isleworth.)

Wednesday, 13th

ROYAL SOCIETY OF MEDICINE
4.30 P.M. *Physical Medicine.* Prof. H. J. Seddon: Restoration of Function in Peripheral Nerve Injuries.
5 P.M. *Proctology.* Use of Medicaments in Diseases of Colon and Rectum.
ROYAL INSTITUTE OF PUBLIC HEALTH AND HYGIENE, 28, Portland Place, W.1
3.30 P.M. Dr. W. B. Stott: Case for Diphtheria Immunisation.
MEDICO-CHIRURGICAL SOCIETY OF EDINBURGH
4.30 P.M. (Royal Infirmary.) Clinical Meeting.

Thursday, 14th

ROYAL INSTITUTION OF GREAT BRITAIN, 21, Albemarle Street, W.1
5.15 P.M. Sir Henry Dale, O.M.: Chemical Transmitters of the Effects of Nervous Impulses. (Third of four weekly lectures.)
EDINBURGH POSTGRADUATE LECTURE
4.30 P.M. (Royal Infirmary.) Dr. E. L. Farquharson: Practical Considerations in Surgery of Hand and Fingers. (Honyman Gillespie lecture.)

Friday, 15th

ROYAL SOCIETY OF MEDICINE
8 P.M. *Obstetrics and Gynæcology.* Mr. A. J. Wrigley: Problems of Postmaturity. Film: Movements of the Human Fœtus.
8 P.M. *Radiology.* Dr. A. Lacassagne: Influence of Wavelength on Radiation Lesions in the Mouse.
FACULTY OF RADIOLOGISTS
2.30 P.M. (Royal College of Surgeons, Lincoln's Inn Fields, W.C.2.) *Therapy.* Mr. Harvey Jackson, Mr. H. B. Stallard, Dr. John Raban: Orbital Tumours.
TUBERCULOSIS ASSOCIATION
5 P.M. (26, Portland Place, W.1.) Mr. C. G. Stillman, F.R.I.B.A.: Design and Equipment of the Modern Chest Clinic. Mr. T. H. McDermott, A.M.I.MECH.E.: Design and Equipment of the Modern Sanatorium.
8 P.M. Dr. Philip Ellman, Dr. F. Ridehalgh: The Changing Chest Clinic.

Saturday, 16th

TUBERCULOSIS ASSOCIATION
12 NOON. (Essex County Council Hospital, Black Notley.) Clinical meeting and papers.
BIOCHEMICAL SOCIETY
2.15 P.M. (King's College, Strand, W.C.2.) Annual general meeting and papers.

Appointments

COLLS, MARGARET, M.R.C.S., M.M.S.A.: temp. asst. M.O.H. for Harrow.
HUTCHINSON, C. A., F.R.C.S.E.: temp. ear, nose, and throat surgeon, Salisbury General Infirmary.
LEWIS, A. J., M.D. Adelaide, F.R.C.P.: director of clinical psychiatry, Maudsley Hospital, L.C.C. (concurrently with chair of psychiatry, University of London).
MACKENZIE, WILLIAM, M.B.: examining factory surgeon for Furnace, Argyllshire.
NASH, D. F. ELLISON, F.R.C.S.: asst. surgeon to the South Eastern Hospital for Children, London.
PAULI, K. P., L.M.S.S.A.: examining factory surgeon for Mitcheldean, Gloucestershire.
SPARKS, J. V., B.A. Camb., M.R.C.P., D.M.R.E.: hon. radiologist, Bristol Royal Infirmary.
WILLIAMS, E. E., M.B., B.SC.: temp. asst. M.O.H. for Harrow.

Births, Marriages, and Deaths

BIRTHS

BARBER.—On Feb. 24, at Hastings, the wife of Dr. H. Stuart Barber—a son.
BRIGGS.—On Feb. 28, the wife of Dr. A. H. Briggs, of Lincoln—a son.
COSIN.—On Feb. 22, at Southend, the wife of Mr. Lionel Cosin, F.R.C.S.—a daughter.
CRAMPTON SMITH.—On Feb. 21, at Northampton, the wife of Surgeon Lieut.-Commander A. Crampton Smith—a daughter.
DROOP.—On Feb. 26, the wife of Dr. R. C. Droop, of Hindhead, Surrey—a daughter.
FELLOWS.—On Feb. 27, in London, Dr. C. Patricia Fellows (née Thrupp), wife of Dr. J. W. E. Fellows—a daughter.
GARROW.—On March 1, the wife of Surgeon Lieutenant Donald Garrow, R.N.V.R., of Nettlebed, Oxon—a son.
INNES.—On Feb. 27, at Appletreewick, near Skipton, Yorks, the wife of Major Alexander Innes, M.B.E., R.A.M.C.—a daughter.
LATCHAM.—On Feb. 23, in London, the wife of Squadron-Leader Peter Latcham, M.B.—a daughter.
LAUBER.—On Feb. 27, in London, the wife of Dr. H. K. Lauber—a daughter.
MCGARVEY.—On Feb. 26, at Wells, the wife of Dr. John McGarvey—a daughter.
MILLER.—On Feb. 23, at Newcastle-on-Tyne, the wife of Dr. F. J. W. Miller—a daughter.
NICOL.—On Feb. 27, in London, the wife of Surgeon Lieutenant A. P. M. Nicol, R.N.V.R.—a son.
OLLERENSHAW.—On Feb. 21, the wife of Lieut.-Colonel R. G. W. Ollerenshaw, R.A.M.C.—a daughter.
ROCHE.—On Feb. 14, the wife of Dr. T. F. Roche, of Enniscorthy Castle, co. Wexford—a son.
STRÖM-OLSEN.—On Feb. 24, at Danbury Park, Essex, the wife of Dr. R. Ström-Olsen—a daughter.
TALLACK.—On Feb. 26, at Clifton, Bristol, the wife of Major R. J. K. Tallack, R.A.M.C.—a son.
TORRIE.—On Feb. 26, in London, the wife of Lieut.-Colonel A. M. Torrie, R.A.M.C.—a son.

MARRIAGES

BEDDOWS—WATSON.—On Feb. 23, at Birkenhead, Edward Charles Beddows, O.B.E., M.C., colonel, late R.A.M.C., to Charlotte Rankine Maule Watson.
BRANCH—MARRIOTT.—On Feb. 23, William Ernest Ralph Branch, of Inglefield Green, to Joyce Evelyn Marriott.
FINNEGAN—BENNETT.—On Feb. 23, at Felpham, Sussex, John Dennis Finnegan, captain R.A.M.C., to Yvonne Eleanor Bennett.
HAYWARD—HARDING.—On Feb. 16, in Philadelphia, Graham William Hayward, M.R.C.P., of London, to Mary Anna Harding.
NAIRN—KEMP.—On Feb. 8, in Colombo, Richard Charles Nairn, surgeon lieutenant R.N.V.R., to Barbara Mary Kemp, Q.A.R., N.N.S.R.
PARKER—SAVORY.—On Jan. 22, at Merstham, Surrey, G. B. Parker, captain R.A.M.C., to Sylvia Maud Savory.

DEATHS

CARR.—On Feb. 24, at Hereford, George Francis Carr, M.C., M.R.C.S., lieut.-colonel R.A.M.C., retd., of Tenbury Wells.
COURT.—On Feb. 20, at Norton Cuckney, Mansfield, Notts., Percy Hyde Court, L.M.S.S.A., aged 75.
DAY.—On Feb. 28, at Harlow, Essex, Francis Newcombe Day, M.B. Camb.
EDGAR.—On Feb. 17, at Preston, William James Edgar, M.R.C.S., aged 66.
FRANKISH.—On Feb. 26, at Quainton, Thomas Frankish, M.B., B.SC. Edin.
GRIFFITH.—On Feb. 26, Walter Spencer Anderson Griffith, C.B.E., M.D. Camb., F.R.C.P., F.R.C.S., aged 91.
HAMILTON.—On Feb. 28, at Twyford, James Hamilton, L.R.C.P.E., aged 85.
MACPHERSON.—On Feb. 28, at Exmouth, William Hugh Macpherson, M.A. Camb., M.R.C.S., aged 83.
MEACOCK.—On Feb. 28, Henry Charles Meacock, M.R.C.S., of Wisbech.
PEARCE.—On Feb. 26, at Salcombe, Devon, Arthur Pearce, M.R.C.S., aged 92.
PORTER-PHILLIPS.—On Feb. 24, John George Porter-Phillips, M.D. Lond., F.R.C.P., aged 68.
SMITH.—On Feb. 27, at Bournemouth, Edward Hickson Smith, M.R.C.S., aged 78.
SPARKS.—On Feb. 27, John Peel Sparks, M.D. Durh., J.P., of Cullercoats, Northumberland.

Brigadier DAVID FETTES, O.B.E., late R.A.M.C., has been appointed honorary surgeon to the King in place of Major-General D. C. Munro.

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PENICILLIN IN SUBACUTE BACTERIAL ENDOCARDITIS

REPORT TO THE MEDICAL RESEARCH COUNCIL ON 147 PATIENTS TREATED IN 14 CENTRES APPOINTED BY THE PENICILLIN CLINICAL TRIALS COMMITTEE *

RONALD V. CHRISTIE
M.D. Edin., D.Sc. Lond., F.R.C.P.
SECRETARY OF THE COMMITTEE

ONLY eighteen months ago few patients suffering from bacterial endocarditis had been treated with penicillin in this country, and the results both here and in the U.S.A. were far from encouraging. Early in 1945 reports were received from America which suggested that better results might be obtained with larger doses given for longer periods. An attempt to determine the best system of dosage was clearly indicated, both to save life and to prevent wastage of a valuable drug still in short supply. Since subacute bacterial endocarditis is an uncommon disease, it was decided that this could be best achieved by a coördinated effort, and in February, 1945, an announcement was made in this journal [1] of the formation of research centres in Belfast, Bristol, Edinburgh, Leeds, Liverpool, London (St. Mary's, Middlesex, and St. Bartholomew's Hospitals), Manchester, and Sheffield. In April four further centres were formed, in Birmingham, Cardiff, Glasgow, and Newcastle. The response to this announcement can be gauged from the fact that by the end of September, 1945, the treatment of 147 patients had been completed. Since that date many more have been treated, but these will be included in a later report, since an adequate follow-up is essential in assessing the results of any treatment of this disease.

THERAPEUTIC RESULTS

Penicillin was given either by three-hourly injection or by continuous intramuscular infusion. No difference in the therapeutic results could be demonstrated, and opinion on the merits of these two methods is divided. Most are agreed, however, that both methods should be available if the treatment of subacute bacterial endocarditis is to be undertaken.

In the first group to be treated the dose was planned to show the relative importance of duration of treatment and the total amount of penicillin given. An answer to this question is given in table I, which summarises the results in 46 patients, all of whom received 5 mega (million) units of penicillin but over different periods of time—20 patients were given 1·0 mega unit a day for five days and all relapsed or died; 12 were given 0·5 mega unit a day for ten days and of these 3 were apparently cured; 14 were given 0·25 mega unit a day for twenty days and of these 7 have remained well. These patients have been under observation for over six months, and, since relapses if they occur almost invariably take place within six weeks of treatment (table V), the conclusion appears to be justified that, within these limits of dosage, the duration of treatment is of much greater importance than the total amount of penicillin given. Increased dosage is no substitute for long treatment.

The results of treatment in a further series of 66 patients are shown in table II; all received penicillin for twenty-eight days but the dose was varied, one group receiving 0·1 mega unit a day, another 0·25 mega unit a day, and another 0·5 mega unit a day. In the first group 43% recovered, in the second group 50%, and in the third group 61% have remained cured after an average follow-up of four months. It should not be forgotten that no matter how effective penicillin may prove to be in the treatment of this disease, a significant death-rate will remain from causes such as heart failure, uræmia, and major emboli. These deaths, many of which occurred during treatment, have little or no bearing on the efficacy of penicillin, and when this is borne in mind the therapeutic results shown in table II are all the more remarkable—11 out of 18 patients receiving 0·5 mega unit a day for twenty-eight days have remained cured. In only one of the 7 patients who died was there any evidence that the penicillin had failed to control the septicæmia, and the infecting organism in this case was more than 32 times as resistant to penicillin as the standard Oxford staphylococcus. For previously untreated patients 0·5 mega unit a day for twenty-eight days seems to be a most satisfactory system of dosage.

Another small group of 12 patients received 0·5 mega unit a day for twenty-one days: of these, 1 died, 2 relapsed, and 9 have remained well after an average follow-up of 244 days.

Lastly, there were 11 patients who received a system of dosage which did not fall into any of the categories described above: 5 of these died, 1 relapsed, and 5 have remained well for an average period of 172 days.

EFFECT OF INADEQUATE TREATMENT

It is of considerable practical importance to know whether inadequate treatment, besides wasting time and penicillin, is prejudicial to later success. The results of treatment in patients who had already received a short course of penicillin are given in table III. A comparison

TABLES I TO IV—RESULTS OF TREATMENT WITH VARIOUS DOSAGE SCHEDULES

I—*Five mega units given in 5, 10, or 20 days (46 cases)*

Daily dose (mega units)	Duration of penicillin treatment (days)	Died	Relapsed	"Cured"	Av. follow-up (days)
1·0	5	6 (1)* (30%)	14 (70%)	0	..
0·5	10	2 (1) (17%)	7 (58%)	3 (25%)	217
0·25	20	4 (3) (29%)	3 (21%)	7 (50%)	249

II—*Daily dose of 0·1, 0·25, and 0·5 mega units for 28 days (66 cases)*

0·1	28	3 (3) (21%)	5 (1) (36%)	6 (43%)	198
0·25	28	13 (5) (38%)	4 (3) (12%)	17 (5) (50%)	117
0·5	28	7 (39%)	0	11 (61%)	114

III—*Previously treated with a 5–10 days' course of penicillin (26 cases)*

1·0	5	0	1	0	..
0·5	10	0	0	2	220
0·1	28	0	2	1	232
0·25	20	4 (3)	1 (1)	3 (3)	260
0·25	28	0	3 (2)	6 (4)	162
0·5	28	0	0	3	175
Total	..	4 (15%)	7 (27%)	15 (58%)	..

IV—*Previously treated with a 20–28 days' course of penicillin (26 cases)*

1·0	5	0	1	0	..
0·5	10	0	1	0	..
0·1	28	0	0	1 (1)	214
0·25	20	1 (1)	1 (1)	1 (1)	200
0·25	28	2	3	2	107
0·5	20	0	1 (1)	0	..
0·5	28	2	6	4	134
Total	..	5 (19%)	13 (50%)	8 (31%)	..

* Figures in parentheses (other than percentages) represent number of patients in whom dosage was only approximately as stated.

* This report is submitted on behalf of the large number of workers who took part in the investigation.

1. *Lancet*, 1945, i, 225.

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of this table with tables I and II does not suggest that previous treatment with a short course is prejudicial to later success, in the patients who survive.

The results of treatment in patients who had already received a long course of penicillin are given in table IV. A comparison of this table with tables I and II shows that if a patient does not respond to a long course of treatment he is less likely to respond to a second course. There are two possible explanations. Lack of response to the first course may indicate natural resistance to penicillin therapy, so that this forms a selected group of resistant cases. Alternatively, the explanation may be that an ineffectual course of treatment may increase the resistance to penicillin.

Repeated estimations of the resistance of the infecting organism to penicillin were made in this series but no convincing evidence of changes in sensitivity was found. Sixteen patients received more than one long course (twenty days or more) of treatment, and in only 2 of these was there any evidence of a change in sensitivity; in both there was a threefold increase in resistance to penicillin as measured by the ordinary dilution methods. Clinical evidence bearing on the question of acquired resistance to penicillin is also meagre, and is confined to two small groups. The first group was of 7 patients in whom septicæmia was uncontrolled during treatment; in 2 it was uncontrolled from the start, but in the other 5 the infection had been previously controlled by a similar or smaller daily dose of penicillin, suggesting that resistance to penicillin had increased; in all of these 5 patients the first course, which seemed at the time to be effective, involved a daily dose of only 0·1–0·25 mega unit. In the second group there were 5 patients who relapsed after a second long course of penicillin; in all the dosage of penicillin was greater in the second than in the first course, and yet the interval before relapse was reduced rather than increased.

This evidence is, to say the least, not incompatible with acquired resistance to penicillin. Delay in controlling the infection also exposes the patient to the many dangerous complications of this disease, and it is therefore safer, from the patient's point of view, to assume that inadequate treatment is prejudicial to later success.

RELAPSES

Short courses of treatment, of ten days or less, are usually followed by relapse within a few days. Even after long courses most relapses occur within thirty days of cessation of treatment, and relapse after fifty days is extremely rare (table V). The conclusions drawn from

TABLE V—CASES RELAPSING AFTER LONG COURSE OF TREATMENT (20 DAYS OR MORE) AND AFTER SHORT COURSE OF TREATMENT (10 DAYS OR LESS)

Days between treatment and relapse	Relapses— after long course	Relapses— after short course	Days between treatment and relapse	Relapses— after long course	Relapses— after short course
0–10 ..	14	17	41–50 ..	2	0
11–20 ..	7	3	51–60 ..	0	1
21–30 ..	6	2	Over 60 ..	1 (130 days)	..
31–40 ..	0	1			

tables I, II, III, and IV, in which the period of follow-up varied from 107 to 260 days, are therefore not unreasonable. There is still, of course, the chance of reinfection, but this was only proved in one patient of this series; this patient relapsed, and *Streptococcus fæcalis* was recovered from the blood 161 days after apparent cure from an infection with *Strep. viridans*.

The treatment of relapses presents a special and often difficult problem. Of 16 patients who relapsed after a course of penicillin which lasted longer than twenty days, all but 4 relapsed or died after a second course which was either longer or of higher dosage than the first. Four patients have received more than two long courses of penicillin, but only one of these has finally responded: she relapsed after 0·5 mega unit for ten days, again after 0·1 mega unit for twenty-eight days, and again after 0·5 mega unit for twenty-eight days, but has now remained well for sixty days after a fourth course of 0·5 mega unit a day for forty-two days. It is this system of dosage—0·5 mega unit a day for six or eight weeks—that we propose usually to adopt in patients who have relapsed.

TABLE VI—COMPARISON OF RESULTS OF TREATMENT WITH SENSITIVITY OF THE ORGANISM TO PENICILLIN. NONE OF THESE PATIENTS HAD PREVIOUSLY BEEN GIVEN A LONG COURSE OF TREATMENT

Daily dose (mega units)	Duration (days)	Result	Resistance to penicillin* 1 or less	2	3–5	8–10	32–64
0·1	28	Died ..	1	2	..	..	..
		Relapsed	*6*	*1*	..	..	..
		Cured ..	6	..	..	1	..
0·25	20	Died ..	1	..	2	..	..
		Relapsed	*4*	..	..	..	..
		Cured ..	7	1	1	..	..
0·25	28	Died ..	6	2	2	..	..
		Relapsed	*3*	*1*	*1*	..	..
		Cured ..	14	3	2	1	..
0·5	20	Died ..	..	..	..	1	..
		Relapsed	..	*1*	*1*	..	..
		Cured ..	4	2	1	..	1
0·5	28	Died ..	3	1	..	..	2
		Relapsed	..	..	..	..	..
		Cured ..	8	3	2	1	..
Total	..	Died ..	11	5	4	1	2
		Relapsed	*13*	*3*	*2*	..	..
		Cured ..	39	9	6	3	1

* Resistance is expressed as a multiple of the resistance of the standard Oxford staphylococcus.

THE INFECTING ORGANISM

Of the 147 patients included in this series, 146 were infected with streptococci and one with a strain of *Hæmophilus influenzæ* which was almost completely resistant to penicillin. Of the streptococci, 136 are described as *Strep. viridans*, 8 as a non-hæmolytic streptococcus, 1 as an anaerobic streptococcus, and 1 as a microaerophilic streptococcus.

The sensitivity to penicillin was measured by the ordinary dilution methods and compared with the standard Oxford staphylococcus. To facilitate tabulation this has been expressed as a coefficient of resistance, and it is clear from table VI that there is a surprising lack of correlation between this coefficient and the results of treatment. There were 16 patients infected with comparatively insensitive streptococci having a coefficient of resistance between 3 and 10; 5 of these have died, 9 have been apparently cured, and only 2 have relapsed. These results compare favourably with those in patients infected with more sensitive organisms. There were 3 patients infected with streptococci more than thirty-two times as resistant as the Oxford staphylococcus, and this degree of insensitivity may be of therapeutic significance. One of these 3 was cured after receiving 0·5 mega unit a day for twenty-one days, but in the other 2 septicæmia remained uncontrolled while they were receiving 0·5 mega unit a day, and both ultimately died. A fourth patient was infected with an extremely resistant strain of *H. influenzæ* and he relapsed six days after receiving 0·5 mega unit a day for twenty-three days.

These results suggest that the resistance of the organism to penicillin as measured by ordinary titration methods is of no clinical significance within a wide range. Only when the organism was more than ten times as resistant as the Oxford staphylococcus did this measure-

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ment appear to be of therapeutic and prognostic importance. This unexpected result may only reflect some inherent inaccuracy in the methods employed in measuring sensitivity, but this does not affect its clinical importance since these methods are in general use.

COMMENTS

Of the 147 patients treated in this series, 50 have died and 81 have been apparently cured, but it should not be forgotten that the systems of dosage at first used were inadequate. Of the remaining 16 patients, some are still under treatment and in a few treatment has been discontinued for one reason or another.

This report is concerned only with evidence which has a bearing on the treatment of subacute bacterial endocarditis. It is expected that a more complete analysis of these and other patients treated within the scope of this investigation will be made at a later date.

SUMMARY

The results here reported provide further evidence of the therapeutic value of penicillin in subacute bacterial endocarditis.

If the administration of penicillin is continued for ten days or more, almost any system of dosage will occasionally produce excellent results. Relapse is, however, more likely to occur if treatment is not both protracted and intensive.

From the evidence available it is safer to assume that inadequate treatment is prejudicial to later success.

In previously untreated patients 0·5 mega unit a day for twenty-eight days has given better results than any other system of dosage employed.

The resistance of the infecting organisms as measured by ordinary titration methods appeared to be of no clinical importance within a wide range. Only when the organism was more than ten times as resistant as the standard test staphylococcus did this measurement appear to be of therapeutic and prognostic significance.

BLOOD-LOSS IN BATTLE CASUALTIES

USE OF TRANSFUSION FLUIDS *

J. V. DACIE
M.B. Lond., M.R.C.P.
MAJOR R.A.M.C.

G. F. HOMER
M.D. Manc.
CAPTAIN R.C.A.M.C.

TRANSFUSION of blood or plasma is now an indispensable procedure in the resuscitation of the severely wounded and has become almost a routine method of treatment. The relative values of blood and plasma have, however, never been conclusively established. The preference throughout the B.L.A. was for blood rather than plasma, a tendency which increased the difficulty of supply. This preference for blood is a general one, based on the clinical experience of many surgeons. The present report deals with an attempt to assess by laboratory means the accuracy of this view and to define more clearly the general course of the hæmatological changes which may follow wounding and the reliance which may be placed on simple laboratory procedures as aids to effective treatment. For this purpose patients were studied at C.C.S., where resuscitation and primary surgery are generally undertaken.

Our first approach was an attempt to estimate the amount of blood lost by different groups of battle casualties. It was hoped that from this knowledge rational recommendations for treatment might be formulated. It soon became clear that some aspects could only be solved by a much more elaborate investigation, but it is believed that the problem has been narrowed down. Most of our patients were studied for 48 hours, but a smaller group was followed for a week or more.

* Based on a report submitted to the Deputy Director of Pathology, 21 Army Group, in April, 1945.

LABORATORY METHODS

The blood samples have been obtained by venepuncture, usually from the median cephalic vein. Relatively large needles ("giving" transfusion needles) with 3 in. of rubber tubing attached have been used for this purpose. Congestion of the veins has been reduced to the minimum possible, and usually the blood would flow gently without the use of a tourniquet. No suction has been used, and our samples have been remarkably free from hæmolysis. The needles have been sterilised by autoclaving and then dried in an oven at a temperature not exceeding 80° C. The anticoagulant used has been the ammonium-potassium oxalate mixture of Heller and Paul, 2 mg. per c.cm. of blood, dried in 10 mg. amounts in ½ oz. bottles at a temperature not exceeding 80° C.

Total red blood-cells, total leucocytes, and *reticulocytes* have been counted by standard hæmatological methods.

The *transfused (donor) red-cell count* has been estimated with a technique of differential agglutination based on that of Ashby (Dacie and Mollison 1943). Special sera containing the α and β iso-agglutinins in high titre were kindly supplied for this purpose by the late Dr. G. L. Taylor. The response per bottle of blood transfused in millions of donor red-cells per c.mm. of recipient's blood has been termed the "survival" of that blood.

The *patient's red-cell count* has been calculated by subtracting the transfused red-cell count from the total red-cell count.

The *cell volume* (hæmatocrit value) has been estimated with Wintrobe's tubes centrifuged at 3000 revs. per min. for 45 min.

Plasma volume has been estimated with Evans-blue dye; the method of extraction and estimation has been that of Harington et al. (1940). Our early observations were made with a Klett visual colorimeter; later with a photo-electric colorimeter we made serial observations on the same patient.

Plasma bilirubin has been estimated with a Lovibond comparator.

CELL-VOLUME (HÆMATOCRIT) CHANGES WITHIN 48 HOURS OF WOUNDING

We thought it useful as a start to follow the cell-volume (hæmatocrit) changes of as many men as possible for a limited time to obtain a general idea of the severity of blood-loss and the response to transfusion of a representative group of battle casualties. We have studied only those men whom the transfusion officer thought to be in need of transfusion. Patients with burns, head injuries, or complicated injuries to limbs and abdomen or chest, and those who had already received transfusions at field ambulances have been excluded; otherwise there has been no deliberate selection.

The decision to transfuse has in all cases been made by the transfusion officer on clinical grounds, and we have usually been in agreement with him. The type and severity of the injuries have been held to be most important in making the decision. The pulse-rate, blood-pressure, and general appearance of the patient have seemed to be less reliable. The latter often accurately reflect the gravity or otherwise of the patient's condition but exceptions are common; in particular we have noticed systolic blood-pressures within the normal range, or even slightly raised, in severely wounded men who have lost considerable quantities of blood. Simple laboratory tests, such as the estimation of hæmoglobin or cell volume, if carried out on a casualty when first admitted, are similarly of little value in deciding the extent of the blood-loss and whether a transfusion should be started. Too much depends on the time which may have elapsed since the man was wounded. In fact, in only 23 out of 75 patients seen within six hours of wounding and who later received transfusions on general clinical grounds was there any certain evidence (a cell volume reduced to 40% or below by spontaneous hæmodilution) that there had been any loss of blood at all.

It is appreciated that the cell volume of any particular sample of blood withdrawn from a shocked patient may not be representative of the cell-to-plasma ratio of the blood taken as a whole. No doubt it would have been possible and better to have collected samples, say, from the femoral vein rather than from the most easily punctured vein, but this was felt to be hardly practicable.

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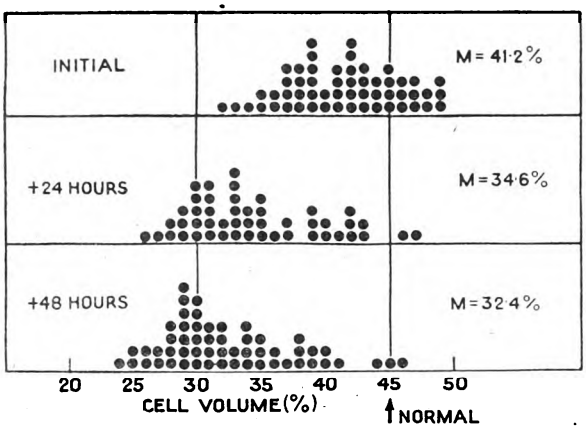

Fig. 1—Cell volumes (hæmatocrit values) of 55 men with moderate to severe limb wounds on admission 1–7 hours after wounding, 24 hours later, and 48 hours after admission. All men received transfusions on 1st day.

This possible unreliability of cell-volume estimation may be more theoretical than real, but it cannot be ignored as a potential source of error. Despite this difficulty and the fact that a hæmatocrit estimation gives a qualitative rather than a quantitative picture of the blood state, its estimation is at least as accurate as the measurement of hæmoglobin by ordinary methods and more accurate than counting red cells. All these measurements are profoundly affected by changes in plasma volume. Fig. 1 shows the distribution of the cell volumes of 55 patients with moderate to severe limb wounds on admission to the C.C.S., 24 hours later, and 48 hours after admission.

The classification of patients according to the severity of their wounds is difficult. Included in our series of limb wounds were 32 men with traumatic amputation of the foot or leg, mostly with additional soft-tissue injuries or compound fractures. There were 2 patients with traumatic amputation of the arm and 10 other men with single or multiple compound fractures, not causing traumatic amputation. Multiple wounds were the rule rather than the exception.

Fig. 1 shows that, when the initial samples were taken 1–7 hours after wounding, in 21 of the 55 men hæmodilution (cell volumes less than 40%) had begun, 5 men having cell volumes of 35% or less, and the mean for the whole group being 41·2%. The average normal has been taken as 45%. The general picture was very different 24 hours later after transfusion and surgical treatment, for by then the men were on the whole considerably more anæmic; the mean was 34·6%. By 48 hours the cell volumes had generally fallen still further, being less than 30% in 18 men, with a mean of 32·4% for the whole group. These patients had received on the average 1·9 bottles of blood and 1·5 bottles of plasma.

Although other factors are involved (see below) it is clear that the major cause for this apparent day-to-day increase in anæmia is an increase in plasma volume out of proportion to any increase in the total volume of the red cells. This relative increase in plasma volume is due to the spontaneous passage of extracellular fluid into the blood-stream and to the effects of transfusing with dilute blood and plasma. Even "whole" blood is dilute, because of the citrate solution, and has a hæmoglobin content of about 75–80%.

We have similarly studied 28 patients with *penetrating abdominal wounds* (fig. 2). There was a tendency to hæmoconcentration in some of the patients on admission, and this was more noticeable during the following day; 8 out of 28 patients then had cell volumes greater than 50%. The only patients to show hæmoconcentration have been abdominal cases with perforation of the hollow viscera only. This is similar to the findings of Evans et al. (1944), who studied a series of civilian cases with various types of serious injury. On the whole the abdominal patients were less anæmic than those with limb wounds; only 2 out of the 28 men had cell volumes less than 30% after 48 hours compared with a third of the patients with limb wounds. They had received on the average 2·0 bottles of blood and 1·5 bottles of plasma. Men with injuries to the solid viscera were usually more anæmic than those whose lesions involved the hollow viscera only (fig. 2).

Our experience of uncomplicated *penetrating chest wounds* has been very small, in only 1 of the 6 patients studied was the cell volume less than 30% after 48 hours.

BLOOD-LOSS IN BATTLE CASUALTIES

For the accurate study of *blood-loss*, estimation of the total plasma volume is necessary in addition to measurement of the cell volume by the hæmatocrit method. Unfortunately the total plasma volume is peculiarly difficult to estimate accurately in a wounded man soon after injury. Often no delay in treatment is permissible. Moreover, even if free-flowing blood can be withdrawn from patients with poor peripheral circulations, the cell-to-plasma ratio of the samples may not be representative, and the recent administration of morphine may affect the even distribution of the test dye throughout the plasma, as claimed by Bowler et al. (1944). Further, should the estimation of plasma volume give a correct figure, there is difficulty in computing blood-loss from this, for the normal blood volume of the casualty is unknown. Gibson and Evans (1937) found that the blood volumes of not more than 70% of their normal subjects fell within ± 10% of the average normal value computed for height, weight, or surface area.

The validity of using the Evans-blue dye method for the estimation of the plasma volume of shocked patients has been reinvestigated by Evans et al. (1944), who have found that in both dogs and man there is no significant difference in the rates of disappearance of the dye in the normal and in the shocked state. Nevertheless, we generally waited until 48 hours after admission before estimating plasma volume, thus avoiding as far as we could some of the possible disturbing factors and the added complication of making the measurement while the patients were being transfused.

For most of the patients studied we have been forced to calculate blood-loss without knowledge of the total blood volume, making for the purposes of the calculation the dubious assumption that the total blood volume is generally restored to the normal level for the patient 48 hours after admission as the result of transfusion and the patient's own efforts. Our observations and those of R. T. Grant (personal communication), however, indicate

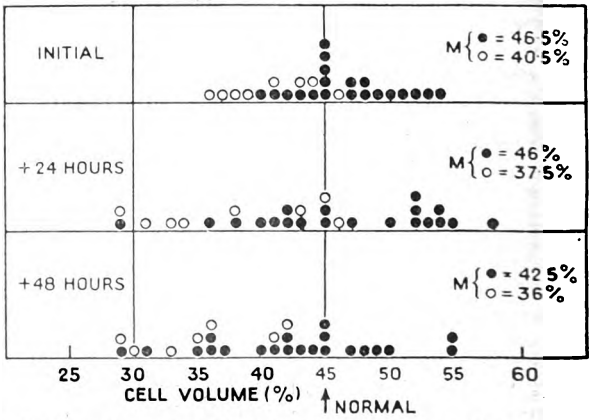

Fig. 2—Cell volumes (hæmatocrit values) of 28 men with penetrating wounds of the abdomen on admission 1–5 hours after wounding, after 24 hours, and 48 hours after admission. All men received transfusions on 1st day. Hollow circles, injuries including damage to liver, spleen, or kidney; solid circles, injuries to hollow viscera only.

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that the blood volume may often be subnormal at this time and continue to increase for several days more (fig. 3). The average total blood volume of our 11 normal subjects was 5350 c.cm., which is very close to the 5335 c.cm. obtained as an average from 49 normal men by Gibson and Evans (1937). The average total blood volume of 15 patients with moderate to severe limb wounds was 4185 c.cm. 48 hours after admission, the theoretical average value for these patients based on their height being 5220 c.cm. according to Gibson and Evans' curve. By the seventh day, however, the blood volume of 7 of these patients had increased to 4950 c.cm. on the average. The probability that in most men the blood volume has not been completely restored by the end of 48 hours means that our calculations of blood-loss are likely to be underestimations rather than the reverse. For example, in 10 patients whose blood volumes at 48 hours have been estimated the average calculated blood-loss has been raised from 46% to 57% by substituting the theoretical normal values for the observed figures for total blood volume. Although this discrepancy is considerable, we feel, nevertheless, that our figures still have relative value, particularly as calculations based on blood-volume determinations are themselves merely approximations for reasons already advanced.

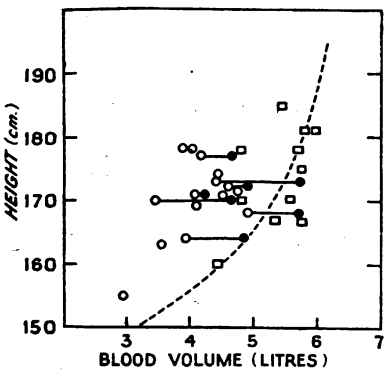

Fig. 3—Hollow circles, total blood volume in relation to height and normal range of 15 men with limb wounds 48 hours after admission and transfusion. Solid circles, total blood volume on 7th day after transfusion in 7 of the men. Hollow squares, total blood volume of 11 normal men. Interrupted line, normal average blood volume in relation to height (Gibson and Evans 1937).

We have calculated *blood-loss* by relating the cell volumes at 48 hours to the presumed average normal 45%, and, in some cases also where the data have been available, by relating the patient's red-cell count at 48 hours to the normal. The proportion of the cell volume which is due to the presence of the transfused blood has been computed from knowledge of the survival of the donor's cells. In 28 patients studied by the Ashby method one bottle of blood raised the recipient's red-cell count on the average by 350,000 per c.mm. at 48 hours. Assuming a normal mean corpuscular volume, 350,000 red-cells per c.mm. corresponds to a cell volume of 2·8%.

The following is an example of the method of calculation in a patient in whom the survival of the transfused cells was not exactly known and the average survival figure had to be accepted. He had received two bottles of blood and had a cell volume of 27% at 48 hours. The cell volume due to the two bottles of blood was taken to be 5·6%; hence that due to his own cells was 21·2%; 21·2% related to 45% gives a blood-loss of 53%. This figure represents a total blood-loss—i.e., the sum total of that lost from the circulating blood-stream by any mechanism during the first 48 hours, external hæmorrhage being usually the most important factor. If cell survival is known, the proportion of the cell volume due to the recipient's own cells can be more easily computed from the knowledge of the ratio of recipient's to donor's cells—i.e., if there were 3,000,000 recipient's cells and 1,000,000 donor's cells per c.mm., 75% of the observed cell-volume figure would be taken as due to the presence of the patient's own cells, assuming that the mean

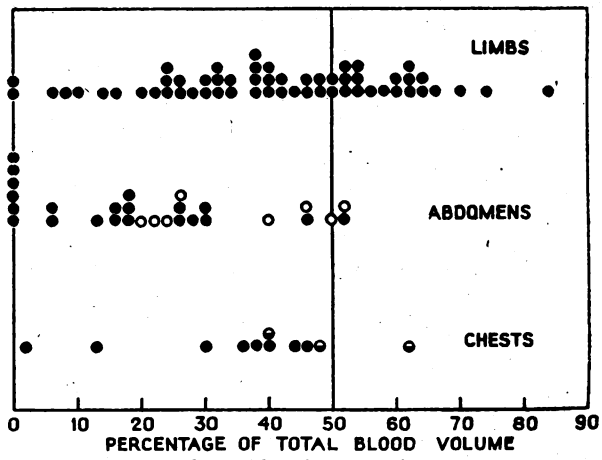

Fig. 4—Estimated total blood-loss from the time of wounding to 48 hours later in 57 men with limb wounds, 29 men with penetrating abdominal wounds, and 11 men with penetrating chest or thoraco-abdominal wounds. Hollow circles, injuries to liver, spleen, or kidneys; half-solid circles, thoraco-abdominal injuries.

corpuscular volume of the donor's cells is normal after transfusion into the recipient.

Calculations based on relating the patient's red-cell count at 48 hours to the normal average, taken as 5,300,000 per c.mm., have given very similar results to those based on cell-volume changes.

The following is an example: total red-cell count = 4,020,000 per c.mm.; transfused red-cell count = 900,000 per c.mm. (three bottles of blood transfused). Hence patient's cell count = 3,120,000 per c.mm.; blood-loss = 41%. Cell volume = 32%; allowance for three bottles of blood = 8·4%. Hence cell volume due to patient's cells = 23·6%; blood-loss = 47%.

In fig. 4 are recorded the calculated percentage blood-losses from the time of wounding to 48 hours after admission into the C.C.S. in 57 men with limb wounds, 29 men with penetrating abdominal wounds, 8 with penetrating chest wounds, and 3 with thoraco-abdominal wounds. Of the 57 patients with limb wounds 19 appear to have lost 50% or more of their original blood volume even at a conservative estimate, compared with 2 out of 29 men with abdominal and 1 out of the 11 men with penetrating chest or thoraco-abdominal wounds. Men with injuries to liver, spleen, or kidney appear usually to lose more blood than those whose injuries are confined to perforations of the gut, although occasionally in the latter type of case hæmorrhage may be serious owing to damage to large mesenteric vessels.

On the whole our calculations of blood-loss have given us higher figures than we anticipated, and we have seriously considered the validity of our observations, but without finding any major fault which would tend to exaggerate the picture. That red-cells may be incarcerated in backwaters of the circulation in shocked patients and thus be lost to the general blood-stream remains a theoretical possibility difficult to refute. At any rate they do not seem dramatically to reappear during convalescence, the later rises in red-cell count (see below) being probably well explained by active erythropoiesis. Our survival studies likewise generally negate the possibility that much of the anæmia is due to a poor survival of the transfused blood. Additional evidence that our calculations are not far wrong is given by the figures of Evans et al. (1944). In 64 patients with skeletal, abdominal, or chest injuries who were clinically considered to be moderately or severely shocked, they found that the average blood-loss on admission was 38% of the calculated normal figures for total blood volume.

POST-TRAUMATIC ANÆMIA

It was noticed early in our work that, if a patient was followed for some days after the first 48 hours, his cell

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volume almost invariably fell progressively, in many instances remarkably. Thus, 37 patients, of whom 27 had limb wounds and 10 abdominal wounds, have been studied for a week or more after wounding. The total red cells, transfused red cells in patients of blood-groups A, B, or AB, reticulocytes, and leucocytes have been counted, and the cell volume (hæmatocrit value), patient's red cells, and plasma bilirubin have been estimated. It was hoped to make serial estimations of plasma volume also, but for various reasons this has only been possible in a few of the men.

Of the 27 patients with limb wounds 18 belonged to groups A, B, or AB, and 7 to group O. Of the 18 in groups A, B, or AB, 15 patients, transfused on the first day only, have shown smooth and significant falls in *cell volume* during the first week or so after wounding. We observed 12 of these men until there was a spontaneous upward movement. This took place between the fourth and the sixth day in 11 of them; in 1 man it occurred earlier, on the second day. In the other 3 patients the cell volumes were still falling when they were transfused on the fifth and sixth postoperative days (fig. 5).

Changes in *total red-cell count* have closely paralleled changes in the cell volume, and by using a technique of differential agglutination it has been possible to follow separately the fate of the patients' own cells and of those given by transfusion. By far the greatest reductions in *patients' red-cell counts* have taken place during the first 24 hours, increases in plasma volume being clearly largely responsible for this. The lowest 24-hour figure has been 1,100,000 per c.mm. (fig. 6).

Subsequent reductions in the patients' red-cell counts have usually been less dramatic, the figures being minimal between the second and the seventh postoperative day in 15 instances. The counts were still falling on the sixth, seventh, and eighth days respectively when 3 men were evacuated. In 5 out of the 18 patients the falls

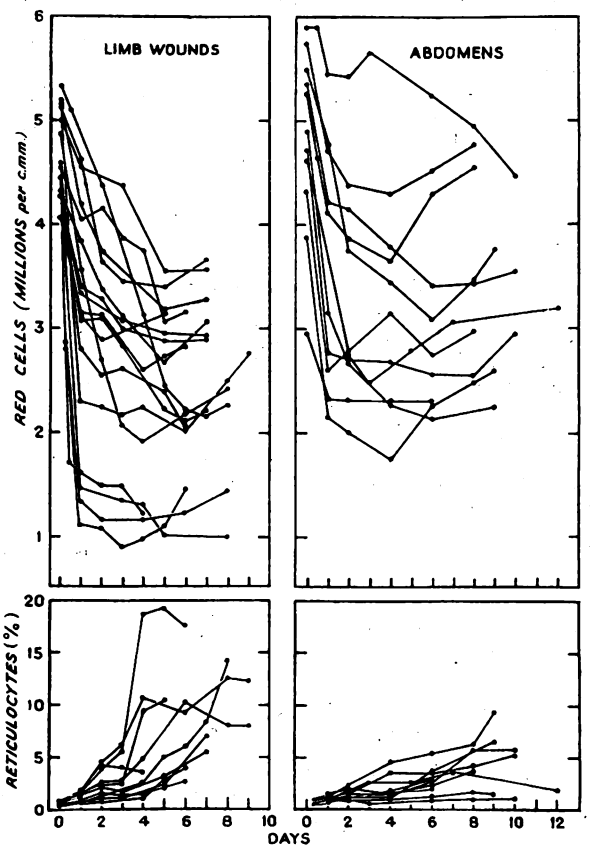

Fig. 6—Changes in patients' red-cell counts and reticulocyte counts in men with limb wounds and penetrating abdominal wounds.

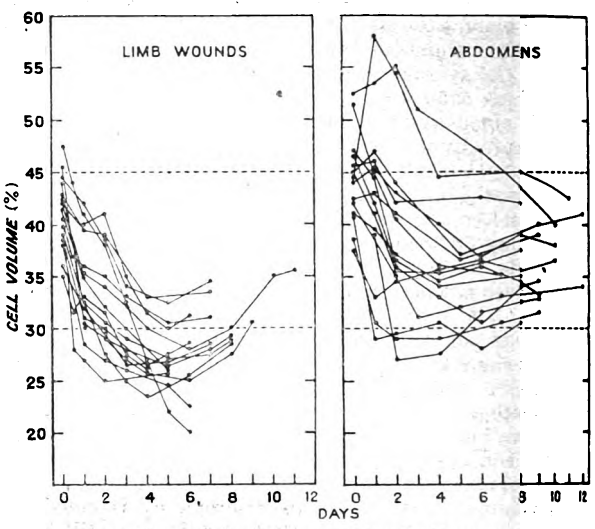

Fig. 5—Changes in cell volume (hæmatocrit value) in men with limb and penetrating abdominal wounds. All men were transfused on 1st day.

in red-cell count after the first day have exceeded 1,000,000 per c.mm.; the greatest changes have been from 4,600,000 per c.mm. at 24 hours to 2,200,000 per c.mm. on the seventh day, and from 3,600,000 per c.mm. at 24 hours to 1,900,000 per c.mm. on the fourth day.

The rising patients' red-cell counts have been associated with brisk *reticulocyte* responses; 6 out of the 20 patients studied having more than 5 reticulocytes per 100 patients' cells on the sixth day after admission. Reticulocyte activity was, as to be expected, inversely correlated with the total red-cell count of the patient (fig. 7).

The changes in the *transfused red-cell count* have been interesting, but the exact interpretation may be open to doubt. Cell survival has been variable but in the main fairly good, and there has seemed to be little to choose between fortnight-old and week-old blood from an Army blood-supply depot. Blood older than this (15–20 days old) seems to have been eliminated considerably more rapidly. This may have been in part due to the unusually cold weather when this blood was used, making storage above freezing-point difficult; the snow-rutted bumpy roads over which the blood was transported may likewise have proved harmful. The average survival of blood 5–14 days old during its first week of life in 15 recipients (43 bottles of blood transfused) is shown in fig. 8 by the course of the interrupted line. The transfused red-cell count has fallen steeply and steadily from the first to the fifth postoperative day, representing a drop of about 25%. Fig. 8 also shows, on a scale $\frac{1}{10}$ of the size, the mean values for the patients' own cells during the same period (continuous line). The two curves follow almost exactly the same course.

The *cell volumes* of the 7 group-O limb patients followed for a week have shown much the same downward course as those of the patients in group A, B, or AB (fig. 8).

We studied 9 patients with penetrating abdominal injuries (groups A, B, and AB) for eight days; 5 of these had injuries to the liver, spleen, or kidneys, in 1 case in addition to perforation of the gut. The greatest falls in *cell volume* and *patients' cells* have taken place during the first and second days, after which the changes were generally small (figs. 5, 6, and 8). The values were minimal between the fourth and eighth days. The changes in the patients' cells and the *transfused cells* have, as in the limb cases, followed very similar courses (fig. 8).

A raised *plasma bilirubin* has been constantly found in all cases 24 hours after transfusion. This hyperbilirubinæmia was not entirely related to the volume of blood transfused, for relatively low as well as high figures have

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followed the transfusion of large volumes of blood. The age of the blood between five and fourteen days has not seemed to make much difference. The highest values were 4–6 mg. per 100 c.cm. in men with penetrating abdominal wounds; 1 of these had a liver injury, but the fact that 3 other patients with apparently similar injuries showed relatively low values indicates that the association of jaundice with such injuries should not be unduly emphasised.

In the present series of patients with limb wounds (all groups) who received blood not more than fourteen days old, the raised bilirubin level on the first day has been followed by a fall at first steep and then more gradual. In 3 only of 19 patients transfused with blood was the level greater than 0·5 mg. per 100 c.cm. on the fifth day. The survival of the transfused cells in these 3 patients with bilirubin levels of about 1·0 mg. per 100 c.cm. was unusually poor. Despite relatively high 24-hour figures the plasma bilirubin of 8 out of 9 abdominal patients had fallen below 1·0 mg. per 100 c.cm. by the sixth day.

Our observations indicate that patients with severe limb injuries, and to a less extent those with abdominal wounds, apparently become progressively anæmic during the week or so following injury, after which spontaneous recovery may be expected. Part of the anæmia is undoubtedly due to hæmorrhage into the patients' dressings, but it is felt that this cannot possibly be the whole story. The changes appear to be out of all proportion to the amount of blood that might be lost in this way. Other possible causes are undue hæmolysis of the transfused cells or of the patients' cells, and a gradual increase in the plasma volume making the anæmia more apparent than real. If the latter supposition is true, it follows that the blood volume of a wounded man may not be restored to normal for 4–7 days despite clinically adequate transfusion. Our own observations already

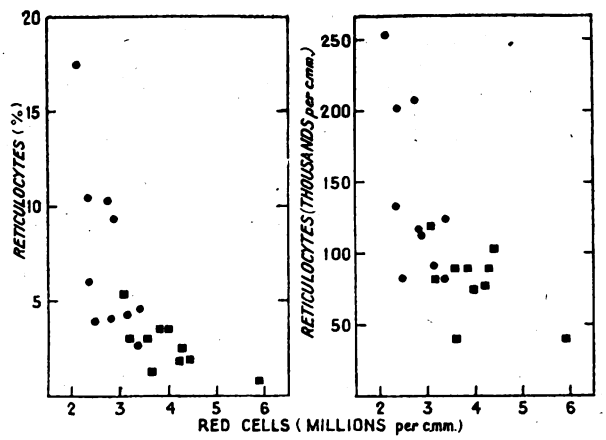

Fig. 7—Relationship between minimal red-cell count and reticulocytes on 6th day after admission, expressed as percentages of the patients' red cells and in absolute numbers: circles, in men with limb wounds; squares, in men with abdominal wounds.

discussed support this contention. The survival of the transfused blood seems in general to have been fairly good, except for that of a batch of blood 15–20 days old used during a very wintry spell.

It is difficult to assess how good a survival this represents. The mean survival of blood 5–14 days old at 24 hours was 350,000 per c.mm. in 15 limb patients, and 360,000 per c.cm. in 9 abdominal patients. The fall from the first to the seventh day was much steeper than is found in healthy recipients of blood of a similar age (Mollison and Young 1942). Moreover, the 24-hour and 7-day figures for survival are probably lower than would be obtained under ideal experimental conditions, but losses at operation and subsequently, and the possible deleterious effects of varying temperatures during storage and shaking due to transport over bumpy roads, may

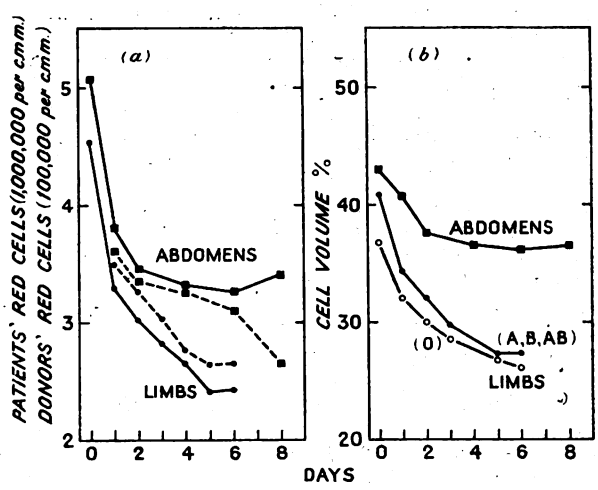

Fig. 8—(a) Average changes in patients' red-cell count (continuous lines) and transfused red-cell count (interrupted lines) of 15 men with limb wounds (solid circles) and 9 men with penetrating wounds of the abdomen (solid squares). (b) Average course of the cell volumes (hæmatocrit values) of 15 men in group A, B, or AB with limb wounds (solid circles), 7 group-O men with limb wounds (hollow circles), and 9 men with penetrating wounds of the abdomen (solid squares).

account for this. We have, in fact, no certain evidence that transfused blood survives worse in battle casualties than it might be expected to do in normal recipients.

The relatively steep fall from the first day onwards, particularly noticeable in the limb cases from the first to the fifth day (fig. 8), is likely to be due to the combined effects of a progressive increase in plasma volume and a real elimination of the donor cells. The fact that in both limb and abdominal patients the courses of the transfused cells and the patients' cells are almost exactly parallel might be taken as favouring the view that increases in plasma volume were the major factor affecting the transfused cell count.

Hæmolysis of the recipients' red cells of the A, B, or AB groups by iso-agglutinins in the transfused group-O blood is a possible cause of anæmia after wounding (Aubert et al. 1942). That this is not a common important factor is suggested by the almost identical course of the cell volumes in O to O and in O to A, B, or AB transfusions (fig. 8). We have insufficient evidence about whether group-O recipients have lower plasma-bilirubin levels than A, B, or AB patients.

We have not performed any tests of the liver function other than the estimation of plasma bilirubin. Obviously any impairment of the ability of the liver to clear the blood-stream of bilirubin would well explain the slight persistent bilirubinæmia that we have observed in a few of our patients.

The possibility of hæmolysis following sulphonamide therapy cannot be entirely excluded, but it does not seem likely that this is important; 7 of the patients with limb wounds did not receive sulphonamide derivatives, and the changes in their blood were similar to those to whom sulphonamides were given.

The effects of sepsis cannot be excluded, but it is difficult to believe that this commonly plays a significant part, since at the time of the greatest anæmia there was very little evidence of sepsis in many of the cases.

We have not gone so far as we would have liked in studying these cases. Serial observations on total cell volume would be very helpful but are an ordeal for the patient. In 7 patients in which this was attempted there was an average increase in plasma volume of 640 c.cm. between the second and seventh days; the total cell volume only increased by 150 c.cm. during the same period. In these patients, whom we believe to be representative, the cell volume, as estimated by the hæmatocrit, decreased on the average by 2·0%, the increase in

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plasma volume thus masking the smaller increase in total red-cell volume.

Our evidence therefore suggests that the apparent anæmia which develops in battle casualties during the first week or so after wounding has a complicated origin; it is due to hæmorrhage into the patients' dressings and to elimination of a proportion of the transfused red cells, but a more important factor is the progressive increase in plasma volume which takes place as the total blood volume is slowly restored to normal. Hæmolysis of the recipients' red cells and the effects of sulphonamide therapy and sepsis appear to be relatively unimportant.

PRACTICAL APPLICATIONS

Our observations provide laboratory support for the view that most patients requiring resuscitation have lost large volumes of blood. Despite the fact that our data are approximate rather than precise, there can be no doubt of this. Wounded men aided by transfusion are often recovering after having lost half or more of their original blood volume, and this is particularly true of injuries to limbs in which damage to main vessels is common. Patients with penetrating abdominal wounds generally bleed less, except when the liver or spleen is torn. Blood-loss in penetrating chest wounds is variable.

The translation of these observations into recommendations about treatment is not easy. Moreover, the ideal is not necessarily practical or indeed necessary. We believe that, leaving aside the question of supply, blood should be the transfusion fluid of choice in all cases, except in burns and perhaps in some patients with intra-abdominal injury where the gut alone is damaged and there may be hæmoconcentration. It also seems clear to us that the more nearly the blood-count and hæmoglobin level are raised to the normal the better for the patient. Complete restoration to normal is certainly not essential. What is required is knowledge of the level of hæmoglobin or cell volume below which no patient's blood should be allowed to drop—i.e., how far below normal a patient's hæmoglobin may fall without reducing his chances of withstanding a severe operation, delaying his convalescence or the healing of his wound, or lowering his resistance to infection. It is clear that, when substantially more than half of a man's blood volume has been lost, transfusion with plasma alone may save life, but will leave such a patient seriously anæmic, although he may withstand a severe operation.

We have followed the course of 4 patients with severe limb injuries necessitating amputation whose cell volumes were between 13·5% and 20% on the third day after injury (equivalent to hæmoglobin 30–45%). They had received large volumes of plasma, averaging 5·4 bottles per patient, and relatively little blood. They could not be considered as fit as the general run of men with similar severe injuries and tended to have rather higher pulse-rates and temperatures than normal. Clinically they improved considerably when transfused with blood and were definitely less querulous and more cheerful.

We believe that no man should be allowed to become as anæmic as this—i.e., have a cell volume of 20% or a hæmoglobin of 45%—but we have not been able to compile data which will support the contention that a man would do better ultimately if his cell volume at 48 hours was 30% rather than 25%, or his hæmoglobin 65–70% rather than 55%. We think, but cannot prove, that the former figures are more desirable and should be aimed at. The difficulty is to differentiate between what is beneficial and what is essential. Most men who have received secondary transfusions show subjective improvement and may show a fall in pulse-rate and temperature, but this does not prove that the transfusion was of ultimate benefit to them and thus justified. Only knowledge of the after-histories of the men could provide the answer, and on this point we have no information.

We have, however, data which bear on how anæmic our series of patients have been in relation to the arbitrarily selected level below which it has been suggested that no man's blood should be allowed to fall—i.e., a cell volume of 30% at 48 hours. Our data show that this figure has not been generally attained at the three C.C.S. at which we have been working. Of 80 limb cases watched for 48 hours, 36 patients (45%) have had cell volumes below 30% at the end of that time. These patients received on an average 4·3 bottles of transfusion fluid, 2·3 bottles of blood and 2·0 bottles of plasma, a blood-to-plasma ratio which seems to be too low. Of these patients, 16 who received more than 2 bottles of plasma (4·6 bottles on the average; blood-to-plasma ratio 0·57) were on the whole considerably more anæmic, the mean of their cell volumes being 26%, compared with the 30·9% of the whole series.

It may be a good working rule, when supplies of blood are limited, to start resuscitation of all patients with 2 bottles of plasma and to follow this up, if the clinical condition of the patient seems to warrant further transfusion, with blood exclusively. In this way those men who require large volumes of transfusion fluid will receive a higher blood-to-plasma ratio than those whose blood-loss has been limited and who respond well to relatively small transfusions. For example, a man requiring 4 bottles of transfusion fluid will receive equal volumes of blood and plasma, and a man requiring 8 bottles will receive 3 bottles of blood to 1 of plasma.

We have records of 28 patients who received 2 bottles of plasma and various amounts of blood (0–6 bottles). The mean of the cell volumes of the series at 48 hours was 31·7%; although only 3 of these patients had cell volumes less than 25%, a further 11 men were probably undesirably anæmic with values between 25% and 30%. If blood was available, it does seem from these figures that the administration of more than 2 bottles of plasma would rarely be justified, if it is accepted that a cell volume below 30% is undesirable.

We also have records of 30 more patients who received but 1 bottle of plasma and various amounts of blood. None of the patients in this group had a cell volume less than 25% at 48 hours, and in only 7 of them were the figures less than 30%. It is of interest to compare these series with the men who received larger volumes of plasma.

No. of patients	Av. volume of plasma (bottles)	Av. volume of blood (bottles)	Blood-to-plasma ratio	Mean cell volume at 48 hr	No. of patients with cell volumes below 30% at 48 hr
30	1·0	2·2	2·2	32·9%	7 (23%)
28	2·0	1·9	0·95	31·7%	14 (50%)
16	4·6	2·6	0·57	25·9%	13 (81%)

In this discussion we have been dealing primarily with the resuscitation of the wounded man before, during, and immediately after surgical intervention. Our data have, however, some bearing on later treatment. The fact that in most men the hæmoglobin and cell volume drop further after the second postoperative day (when they may be evacuated from the C.C.S.) suggests that hæmoglobin estimation on all men with moderate or severe limb wounds is very desirable on arrival at general hospitals, so that the more anæmic men may be appropriately transfused.

CONCLUSIONS

An investigation has been made into the hæmatological changes which may take place in men as a result of severe wounding. The objects were (*a*) to obtain data bearing on the relative merits of blood and plasma from the point of view of immediate resuscitation and the after-history of the patient; (*b*) to assess the value of simple laboratory procedures as aids to effective transfusion

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therapy; (*c*) to evaluate the importance of the loss of blood which may result from wounding; and (*d*) to determine the cause and general course of post-traumatic anæmia.

The estimation of hæmoglobin or cell volume when a patient is first admitted has been found to be of little value in deciding how severe blood-loss has been and whether transfusion is necessary. An estimation 48 hours later is of more value and may be safely used as a guide to transfusion therapy. The loss of blood by surviving casualties may be very severe and greater than half the original blood volume of the patient. This loss may not be fully restored by clinically adequate transfusion. The progressive increase in plasma volume which subsequently takes place is the most important of the causes of the apparent post-traumatic anæmia so often seen during the first week or so after wounding.

If burns are excepted, transfusion with blood is probably the ideal form of treatment for the great majority of battle casualties who need intravenous therapy on admission, but in considering the relative merits of blood and plasma the question of availability and storage cannot be ignored. A proportion of blood in addition to plasma is probably essential for the survival of men in whom the loss of blood has been severe enough to produce a profound and persistent collapse. At the other end of the scale there are men who, although losing relatively little blood, appear to be sufficiently shocked to warrant transfusion. Blood is often given to these men unnecessarily.

It is not possible to apply the ideal method of adjusting the volume of fluid given and the proportion of blood to plasma in accordance with the severity of the blood-loss, for there is no simple practical method for estimating this. The decision to transfuse has therefore to be made on clinical grounds, and a consideration of the general type and severity of the injuries appears to be the best basis for deciding this. The practice of starting each transfusion with 2 bottles of plasma and following this with blood exclusively, if the clinical condition of the patient seems to warrant further transfusion, is a means of conserving supplies of blood and ensuring that the patients who have lost most blood and therefore need the largest transfusions receive the greatest proportion of blood.

We wish to thank the Director of Medical Services, 21 Army Group, and the Deputy Director of Medical Services, 1st Canadian Army, for permission and facilities to carry out this work. We have been attached to the 16th and 32nd British and the 6th Canadian C.C.S. and have greatly appreciated the coöperation and interest shown by the commanding officers, surgeons, and transfusion officers of these units, by Colonel J. S. K. Boyd, O.B.E., Colonel R. W. Fairbrother, R.A.M.C., and by Lieut.-Colonel G. A. H. Buttle, O.B.E., R.A.M.C., and the staff of the base transfusion unit.

REFERENCES

Aubert, E. F., Boorman, K. E., Dodd, B. E., Loutit, J. F. (1942) *Brit. med. J.* i, 659.
Bowler, R. G., Crooke, A. C., Morris, C. J. O. R. (1944) *J. Physiol.* 103, 137.
Dacie, J. V., Mollison, P. L. (1943) *Lancet*, i, 550.
Evans, E. I., Hoover, M. J., James, G. W., Alm, T. (1944) *Ann. Surg.* 119, 64.
Gibson, J. G. jun., Evans, W. A. jun. (1937) *J. clin. Invest.* 16, 317.
Harington, C. R., Pochin, E. E., Squire, J. R. (1940) *Clin. Sci.* 4, 311.
Mollison, P. L., Young, I. M. (1942) *Quart. J. exp. Physiol.* 31, 359.

URINARY MEPACRINE
IN RELATION TO INCIDENCE AND DIAGNOSIS OF MALARIA

JOHN YUDKIN
M.A., M.D., Ph.D. Camb., F.R.I.C.
LATE CAPTAIN R.A.M.C.

IN a paper published a short while ago (Yudkin 1945) some possible uses of the estimation of urinary mepacrine were suggested. The value of such estimations has been confirmed in tests carried out during August, September, and October, 1945, in a general hospital in Sierra Leone, British West Africa. All the subjects were European Service personnel who should have been taking 0·7 g. of mepacrine prophylactically each week. Mepacrine was estimated by the extraction-adsorption method described in the paper cited.

The results of two investigations are described here. The first was the determination of urinary mepacrine in apparently healthy individuals of groups with different malarial incidence, and the second the determination of urinary mepacrine in unselected patients admitted to hospital.

Mepacrine Excretion and Malarial Incidence

In the European Services in Sierra Leone at the time of this investigation the incidence of malaria was highest among Italian collaborators and lowest among Army personnel.

As suggested in the previous paper, urinary mepacrine should give a measure of blood mepacrine, and there should then be a correlation between the amount of mepacrine excreted in unit time and the incidence of malaria. An investigation was therefore made of the urinary excretion of mepacrine in a group of Italian and a group of British soldiers, the former having a malarial incidence about four times that of the latter.

Ideally, the urinary excretion of mepacrine should be measured over as long a period as possible, say twenty-four hours. Even in the best disciplined units, however, it is impossible to rely on obtaining accurate and complete specimens of twenty-four hours. On the other hand, it is practicable to rely on specimens collected over three hours. Such specimens were collected from 8 A.M. to 11 A.M. from 33 apparently healthy Italian collaborators and from 26 apparently healthy British other ranks of one unit. The results are summarised in tables I and II

TABLE I—URINARY EXCRETION OF MEPACRINE IN 3 HOURS

Group	No. of subjects	Av. volume (ml.)	Av. conc. of mepacrine (mg./litre)	Av. amount of mepacrine in 3 hours (mg.)
British Army personnel	26	228	4·17	0·77
Italian collaborators	33	226	1·74	0·365
Naval sick-bay attendants	10	185	6·15	0·93

TABLE II—URINARY EXCRETION OF MEPACRINE IN 3 HOURS: DISTRIBUTION OF EXCRETION VALUES

Excretion in 3 hours (mg.)	Number of subjects	
	British	Italian
0 ..	0 (0 %)	4 (12 %)
Less than 0·1 ..	0 (0 %)	7 (21 %)
Less than 0·2 ..	1 (4 %)	13 (39 %)
More than 0·6 ..	18 (70 %)	6 (18 %)

and the figure. Table I also shows the results in a small group of 10 Naval sick-bay attendants among whom mepacrine discipline was known to be very good. It will be seen that the lowest excretions are found in personnel of the group with the highest malarial incidence.

Mepacrine Excretion and Diagnosis of Malaria

Mepacrine was estimated in specimens of urine from a series of unselected European patients of all kinds as soon as possible after admission to hospital. At first, an attempt was made to collect specimens over three hours, as in the previous investigation; but the condi-

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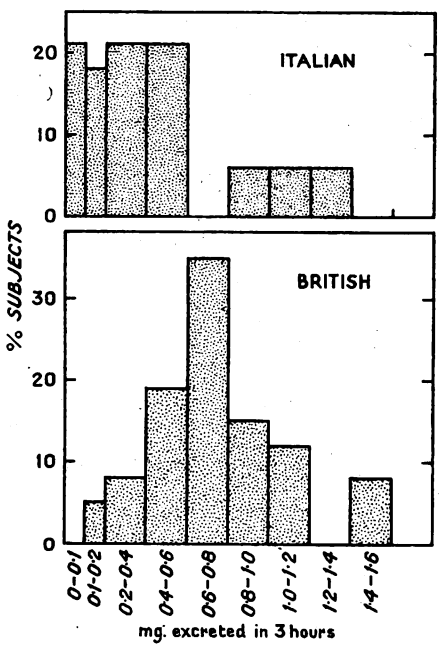
tions in the hospital—the changing of nursing sisters and orderlies and the unreliability of the orderlies—made it impossible to be certain that the specimens were accurately collected. Further, in cases of suspected malaria the medical staff often wished to administer mepacrine before the lapse of three hours; the excretion values then found would clearly be higher than the values at the time of admission.

A method was therefore sought by which an estimate of the mepacrine output could be made in single "untimed" specimens of urine. The method eventually adopted was based on the following considerations. The output of mepacrine in a given time is the product of the concentration of mepacrine and the volume passed in that time—i.e., the rate of urinary excretion. An index of the latter is given by the specific gravity, a low specific gravity showing a rapid rate of excretion, and vice versa. These considerations suggested that a simple method of assessing the output of mepacrine would be to determine the concentration of mepacrine and the specific gravity in a specimen of urine, and to standardise the concentration to an arbitrary specific gravity.*



Distribution of excretion values of mepacrine in British and Italian personnel

"STANDARD" MEPACRINE CONCENTRATION

The "standard" urinary concentration of mepacrine is defined as the concentration which would be present if the specific gravity of the urine were 1·010. Thus, if the measured concentration is 4 mg. per litre and the specific gravity is 1·020, the urine would have to be diluted to twice its volume to make its specific gravity become 1·010, and this would make the standard concentration 2 mg. per litre. The formula is as follows:—

$$\text{Standard concentration} = \frac{\text{actual concentration}}{\text{specific gravity} - 1} \times 10.$$

The adequacy of this method was tested in two ways. The first was to see whether standardisation of the concentration for specific gravity in specimens from a group of individuals gave similar results to those given by the measurement of total excretion over a certain period. The second test was to see whether, in a number of specimens from one or two individuals, the standard concentration was as constant as the excretion in unit time.

Standard Concentrations in Groups.—The specific gravity had been measured in the specimens from the three groups of Italian, British Army, and Royal Navy personnel described above. The standard concentration was calculated and compared with the amounts of mepacrine excreted in three hours. Table III shows

TABLE III—URINARY MEPACRINE: 3-HOURLY EXCRETION AND STANDARD CONCENTRATION

Group	Av. amount of mepacrine (mg./3 hr.)	Av. standard concentration (mg./litre)
British Army personnel ..	0·77	2·8
Italian collaborators ..	0·365	1·4
Naval sick-bay attendants	0·93	3·6

the mean standard values, together with the values for the three-hourly excretion.

The relative excretion of mepacrine in the three groups is much the same when given as either total output or standard concentration. Further, a comparison of the two methods of determining mepacrine output showed a high degree of correlation ($r = 0{\cdot}81$); hence it seems justifiable to take the standard concentration as a measure of urinary output of mepacrine.

Standard Concentrations in Individuals.—All the specimens passed during several days by two subjects were analysed, and both the hourly output of mepacrine and the standard concentration were determined for each specimen (table IV). It will be observed that there was considerable variation in the rate of excretion of urine (from 32 to 1250 ml. per hr.) and the specific gravity (from 1·001 to 1·024) of the specimens. Subject "S," by coöperating well in the sergeants' mess during the evenings, was able to increase his urinary output some 40 times. In spite of this the standard concentration of mepacrine varied little more than the hourly excretion.

TABLE IV—URINARY MEPACRINE: CONSTANCY OF STANDARD CONCENTRATION

—		Subject "S"	Subject "H"
No. of hours of investigation ..		120	72
No. of specimens		43	21
Total excretion (mg./l.)	Mean	0·318	0·226
	Range of total	0·21–0·53	0·17–0·30
	Range of 90 %	0·23–0·44	0·19–0·28
Volume (ml./hr.)	Mean	298	94
	Range of total	32–1250	24–390
	Range of 90 %	38–935	33–310
Standard concentration (mg./l.)	Mean	3·55	3·15
	Range of total	2·3–6·8	1·9–4·5
	Range of 90 %	2·8–5·5	2·2–3·9
Specific gravity	Mean	1·0083	1·0091
	Range of total	1·001–1·024	1·002–1·022
	Range of 90 %	1·002–1·022	1·003–1·018

From these results, too, it can be taken that the standard concentration gives about as good an index of mepacrine excretion as total mepacrine output. Apart from a few patients in the earlier stages of the investigation, the standard urinary concentration of mepacrine has been determined throughout the series.

URINARY MEPACRINE IN MALARIA AND OTHER CONDITIONS

The concentration of mepacrine in specimens from 169 patients has been determined, and in 149 of these the specific gravity was measured and the standard concentration calculated. The cases were divided into four groups: (1) proved malaria; (2) clinical malaria; (3) medical conditions other than (1) and (2); and (4) surgical conditions.

Cases of *proved* malaria were those in which malarial parasites were found in the blood; in this series these were always *Plasmodium falciparum*. Cases of *clinical* malaria were those in which, although malarial parasites were not found, there was sufficient clinical evidence of

* Many urinometers do not read accurately. Nine urinometers in two laboratories have been tested against distilled water, and all gave low readings, between 0·994 and 0·998. It is therefore necessary to test all urinometers and to apply a correction for any error revealed.

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malaria to justify routine treatment with mepacrine. To prevent the urinary findings from unconsciously affecting the results of the blood films, the estimations of mepacrine were carried out by me, and the blood films were examined first by the senior laboratory technician, who was well experienced, and then confirmed by me.

Since the excretion of mepacrine in the healthy Italians was appreciably lower than that of British personnel, I have given the results separately for the Italians and British. The average observed concentrations of the total of 169 patients, and the standard concentration of 149 patients, are given in table V.

TABLE V—URINARY MEPACRINE OF HOSPITAL PATIENTS

—	Group	Av. concentration (mg./litre) and no. of subjects			
		Proved malaria	Clinical malaria	Other medical cases	Surgical cases
Actual concentration	British	0·8 (4)	6·7 (33)	6·85 (51)	6·65 (41)
	Italian	1·0 (11)	4·2 (14)	3·1 (10)	2·2 (5)
Standard concentration	British	0·3 (4)	3·25 (27)	3·35 (47)	3·3 (38)
	Italian	0·39 (9)	2·0 (11)	1·3 (8)	0·93 (5)

The outstanding feature of these results is the appreciably lower concentration of mepacrine in the urine in proved malaria. All the patients were supposed to be taking prophylactic mepacrine. The individual results in table VI show that in no case was the actual concentration more than 2 mg. per litre nor the standard concentration more than 0·7 mg. per litre.

TABLE VI—URINARY MEPACRINE OF CASES OF PROVED MALARIA (SUBTERTIAN)

Case	Service	Concentration of urinary mepacrine (mg./litre)		Case	Service	Concentration of urinary mepacrine (mg./litre)	
		Actual	Standard			Actual	Standard
18	Italian	1·0	..	81	Italian	1·5	0·7
19	,,	1·5	..	95	,,	0·5	0·25
21	,,	1·5	0·3	101	,,	2·0	0·55
47	,,	0·5	0·3	3*	R.N.	0	0
48	,,	1·0	0·6	98	,,	1·5	0·55
63	,,	0	0	109	,,	0	0
68	,,	1·5	0·6	59	Army	2·0	0·6
73	,,	0	0		Average	0·9	0·3

* Did not absorb mepacrine (Yudkin 1946).

A second noteworthy feature of table V is the excretion values in clinical malaria. These are much higher than the figures in proved malaria and very similar to those in surgical cases and other medical cases.

It is of interest to compare the values found in the different British Services. Table VII shows the results for all the cases except those with proved malaria. The slightly lower values found in the Navy and Air Force, compared with the Army, accord with the slightly higher incidence of malaria in these two Services during the previous twelve months. The number of individuals with a standard concentration below 1·5 mg. per litre shows that the proportion with low excretions are similarly related to the malarial incidence (table VIII). These results are statistically significant.

TABLE VII—URINARY MEPACRINE: COMPARISON OF SERVICES (ALL CASES EXCEPT PROVED MALARIA)

—	Army	Navy and R.A.F.
Av. actual conc. (mg./litre) ..	7·1 (73)	6·2 (52)
Av. standard conc. (mg./litre) ..	3·7 (60)	3·05 (48)

TABLE VIII—URINARY MEPACRINE: CASES WITH LOW EXCRETION VALUES: COMPARISON OF SERVICES (ALL CASES EXCEPT PROVED MALARIA)

—	Army	Navy and R.A.F.
Total no. of cases	60	48
No. excreting less than standard conc. of 1·5 mg./litre	5 (8%)	8 (16%)

Discussion

During this investigation subtertian malaria was by far the commonest type in this colony. Every positive film in this series revealed only *P. falciparum*. It should therefore be emphasised that, until further work is done, the conclusions drawn can only be taken as applying to subtertian malaria.

MALARIAL INCIDENCE

Four possible reasons may be suggested for the higher malarial incidence in the Italians compared with the British.

(1) *Higher Rate of Exposure.*—It is known that the Italians exposed themselves to infection more often than the British, by frequenting African quarters at night. An index of this was the higher incidence of venereal disease among the Italians. On the other hand, recent work in the Pacific zone has shown that even very high and repeated exposure to malarial infection never leads to infection in well-mepacrinised individuals (Fairley 1945).

(2) *Lowered Resistance.*—Most of the Italians had been in East or West Africa for as long as six or eight years. The Italian medical officer was strongly of the opinion that this was the main, if not the only, cause of the high malarial incidence. There is no evidence, however, that mepacrine is less effective in Europeans if they have stayed in Africa for a long time.

(3) *Inadequate Absorption of Mepacrine.*—A decreased absorption of mepacrine, even if this is taken regularly, would explain both the higher incidence of malaria and the lower excretion of mepacrine. It is difficult, however, to suggest any defect in absorption which would be found only in the Italians. Moreover, urinary analysis showed that mepacrine given therapeutically to patients with malaria was absorbed just as well by the Italians as by the British. A defect in absorption is in fact very uncommon, and only one case has so far been described (Yudkin 1946).

(4) *Inadequate Intake of Mepacrine.*—This is by far the most reasonable explanation of the higher malarial incidence and the lower excretion of mepacrine. The latter results bear out the hypothesis that a low excretion of mepacrine will be found in groups in which there is a higher incidence of malaria.

DIAGNOSIS OF MALARIA

The results described here suggest that a reasonable excretion of mepacrine is not compatible with malarial infection. This, again, accords with the observations that adequate intake gives protection, and that adequate intake is shown by the urinary excretion. It is impossible from this small series to give an absolute minimal level of urinary excretion which indicates a protective level in the blood. In this series no case of proved malaria gave a standard urinary mepacrine concentration of more than 0·7 mg. per litre. I suggest tentatively that a standard concentration of more than 1·5 mg. per litre, which is twice as high as the maximum encountered in this series, can be taken as excluding the diagnosis of malignant tertian malaria. From a larger series it should be possible to determine more accurately a critical value above which malaria can be excluded.

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Clinical malaria may be defined as a condition in which, although no parasites are found in the blood, there are symptoms and signs suggesting malaria, and which is consequently given antimalarial treatment. Many clinicians agree that some cases in this group are not malaria, although their true diagnosis remains unknown. On the other hand, they consider that some are true malaria in which, for technical or other reasons, malarial parasites are not found. Their opinion varies about the proportion which they consider is probably malaria and that which they consider is probably not. The general view, however, is that the proportion which really is malaria is fairly high.

The results described here, together with certain other considerations, suggest that only the minority of cases now diagnosed as clinical malaria are in fact malaria. There are four pieces of evidence which may be adduced to support this statement:

(1) If it is true, as I have suggested, that a standard urinary mepacrine concentration above 1·5 mg. per litre can be taken to exclude malaria, then about two-thirds of the Italian cases of clinical malaria and about nine-tenths of the British cases could not be true malaria.

(2) The average mepacrine excretion and the distribution of excretions in clinical malaria are very similar to those in other conditions. For example, the proportion of cases with a standard mepacrine concentration of less than 1·5 mg. per litre is almost identical in clinical malaria, other medical conditions, and surgical conditions (table IX). If a fair

TABLE IX—DISTRIBUTION OF EXCRETION VALUES: COMPARISON OF DISEASE GROUPS. PROPORTION OF BRITISH CASES WITH STANDARD EXCRETION BELOW 1·5 MG./LITRE

—	Clinical malaria	Other medical cases	Surgical cases
Total no. of cases	27	47	38
No. with standard excretions below 1·5 mg./litre	3 (11%)	5 (11%)	5 (13%)

number of the cases in the group of clinical malaria were true malaria, one would expect to find a greater proportion with a low urinary excretion of mepacrine.

(3) From the middle of August to the middle of September, when the Italians left Sierra Leone, there were 3 or 4 Italian cases of proved malaria to 1 British. Of medical cases other than malaria there were about 9 Italians to 11 British (table X). Now, if all the cases of clinical malaria were really cases o malaria, one would expect the proportion of Italian to British to be 3 or 4 to 1; hence with the 10 British cases of clinical malaria seen during this time one would expect 30 or 40 Italian.

If, on the other hand, none of the cases of clinical malaria was really malaria, then with the 10 British cases one would expect about 8 Italian. The actual number of Italians, 10, is much closer to that derived from the assumption that

TABLE X—NUMBER OF CASES SEEN DURING AUGUST AND SEPTEMBER, 1945 *

Group	Proved malaria	Clinical malaria	Other medical cases
Italian ..	11	10	9
British ..	4	10	11

* During the three months July to September the number of cases of proved malaria was Italian 23, British 6.

none of the cases was true malaria. Although the total number of cases in the series is not large, it is nevertheless justifiable to conclude from this argument that the majority in the group designated as clinical malaria are in fact not malaria.

(4) It is well known that the incidence of malaria in the British Services has fallen considerably in the last few years. In the Army in Sierra Leone it fell in 1944 to about a thirtieth of the incidence in 1941. During the same time the proportion of cases diagnosed as malaria in which parasites have not been found has increased. In the series under review the proportion is about 70%, whereas in 1941 it was 20%. Although this may in part be due to different standards adopted by the different technicians and pathologists, the increase is what one might expect if many of the cases of clinical malaria are some other condition or conditions the incidence of which consequently remains unaffected by the measures responsible for the fall in the incidence of malaria.

I shall not presume to suggest what the other conditions are that may be included under the diagnosis of clinical malaria, but that this term does often cover such other conditions is not a new or surprising view. The arguments presented here suggest only that, in the group called clinical malaria, the proportion of cases which are not malaria is higher than is usually supposed.

Finally, it should again be emphasised that the results and conclusions presented here refer to subtertian malaria. It is very likely that they apply also to other types of malaria, but this remains to be proved.

Summary

Measurements of the urinary excretion of mepacrine were made in specimens from European Service personnel in Sierra Leone, and two types of investigation are described.

In the first, it is shown that the incidence of malaria in two groups is related to the rate of excretion of mepacrine.

In the second, specimens were examined from a series of 169 hospital patients of all kinds. As it was impossible to obtain correctly timed specimens, a method was devised by which the rate of excretion of mepacrine could be assessed from a single random specimen. By this means, "standard" excretion values were determined in 149 of these patients. It was found that no case of proved malaria had a high excretion of mepacrine, and from this and certain theoretical considerations it is suggested that a high excretion of mepacrine can be taken as excluding a diagnosis of malaria. Reasons are given for supposing that the diagnosis of clinical malaria covers a high proportion of cases which are not malaria.

My thanks are due to Colonel A. J. Leslie-Spinks for permission to publish this paper, and to Captain P. U. Colyer, R.A.M.C., graded physician, for his enthusiastic encouragement and criticism.

REFERENCES

Fairley, N. H. (1945) *Trans. R. Soc. trop. Med. Hyg.* 38, 311.
Yudkin, J. (1945) *J. trop. Med.* 48, 1.
— (1946) *Brit. med. J.* 1, 271.

SPINAL ANÆSTHESIA

VARIATIONS IN DOSAGE REQUIRED

A. R. HUNTER
M.D. Glasg., F.R.F.P.S., D.A.
ANÆSTHETIST TO MANCHESTER ROYAL INFIRMARY

LAST year[1] I described a new volumetric technique of spinal anæsthesia based on the use of the minimal effective subarachnoid concentration of an anæsthetic. Further experience has shown that this quantity is not the same for all persons. However, the limits of the variation are not wide enough to invalidate the method, since it is a simple matter to forecast what dose of a drug will be required for any particular patient.

Briefly, subjects who are resistant to general anæsthesia—the robust and the athletic—require a larger dose of a spinal anæsthetic. Further, it has been found that children and young adults of either sex are also resistant; a similar observation has been made by Lemmon and Hager[2] with regard to continuous spinal anæsthesia. The doses of 'Nupercaine' and amethocaine in the original paper[1] will therefore require some 33% increase when the method is applied to athletic

1. Hunter, A. R. *Lancet*, 1945, i, 82.
2. Lemmon, W. T., Hager, H. G. jun. *Ann. Surg.* 1944, 120, 129.

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subjects. I do not recommend any increase in the dose of procaine, because the tests with this drug were carried out on Service personnel; it might even be desirable to use rather smaller quantities in civilian patients. Great accuracy of dosage is not an essential of the technique, because a small overdose will merely cause the anæsthesia to spread a segment or so higher than was intended, and slight deficiencies of anæsthesia are readily covered by 'Pentothal' hypnosis. As with any other technique of spinal anæsthesia, premedication with 'Omnopon' and scopolamine to the point of drowsiness will go far to reduce the number of patients who require supplementary anæsthesia. Even so, I give pentothal in hypnotic doses as a routine during major abdominal operations. Numerous serial blood-pressure determinations have indicated that the small quantities of pentothal given are without adverse effect on the stability of the circulatory system.

TABLE I—DOSAGE OF STOVAINE FOR SPINAL ANÆSTHESIA BY VOLUMETRIC DISPLACEMENT

Operation	Level required	Dose of stovaine (mg.)	Dose of 5% solution (c.cm.)	Final volume to be injected (c.cm.)
Hæmorrhoids, cystoscopy, &c.	L1	50	1	5
Herniotomy ..	D10	60	1·2	8
Laparotomy, prostatectomy	D6	70	1·4	12
Cholecystectomy, gastrectomy ..	D4	80	1·6	14

The exact causation of the variation in resistance to spinal anæsthetics is not clear, but the following explanation is suggested. When an anæsthetic is placed in the subarachnoid space, some of it is absorbed directly into the capillaries of the pia and arachnoid and exerts no effect on the nerve-fibres; the remainder is adsorbed onto or absorbed into the nerve-roots and temporarily interrupts their function. Only the second portion is effective in causing anæsthesia. It is reasonable to assume that patients with an efficient circulation will absorb a large proportion of the injected agent into their blood-stream, leaving little to exert an anæsthetic effect on the nerve-roots in the theca. On the other hand, elderly arteriosclerotic patients will absorb substances relatively slowly into their blood-stream, and local action will be much more in evidence. The difference is the same as that which exists between the action of local anæsthetic solutions with and without adrenaline. Since blood-stream absorption is much more active in athletic and youthful subjects, it is necessary to give them larger doses; even so, it would be expected that anæsthesia would tend to pass off rather rapidly in such people, and this is indeed my experience.

TABLE II—INCIDENCE OF HEADACHE AFTER SPINAL ANÆSTHESIA WITH DIFFERENT AGENTS

Anæsthetic used	Total no. of cases	Patients with headache	Incidence of headaches %
Stovaine	64	9	*14*
Amethocaine ..	140	20	*14*
Heavy nupercaine	102	14	*14*
Procaine	115	13	*11*

The minimal effective subarachnoid concentration of 'Stovaine' has been determined as just under 6 mg. per c.cm. After a brief trial in 10 patients it appeared that the comparable dose of 'Monocaine'* was about 7 mg. per c.cm. A dosage table for stovaine is given in table I.

* Provided by the Novocol Chemical Manufacturing Co. Inc., New York.

To discover the incidence of headache after the use of various drugs, I visited patients during the post-operative period and questioned them on the subject directly but in the least suggestive manner possible. Those who complained of headache were asked what was the effect of posture on their pain. Almost every one said that they were much more comfortable when lying flat than when they sat up. These headaches were therefore due to lowered intracranial pressure from leakage of cerebrospinal fluid at the site of lumbar puncture. As table II shows, their incidence is unrelated to the use of any particular anæsthetic agent.

SUMMARY

When the volumetric technique already described [1] for hyperbaric solutions is used, it is necessary to increase the dosage in youthful, athletic, and robust subjects, because much of the drug is lost by absorption into the blood-stream in these people before it can affect the nerve-roots in the subarachnoid space.

As with all other techniques of spinal anæsthesia, adequate premedication is essential. A few apprehensive subjects require supplementary pentothal hypnosis, which is also given as a routine during major abdominal operations.

The technique is applicable to spinal anæsthesia with stovaine and monocaine.

The incidence of headache after spinal anæsthesia by this method is independent of the drug used.

ACHALASIA OF ŒSOPHAGUS
FOLLOWING DEPRESSED FRACTURE OF BASE OF SKULL

JOHN J. FLEMINGER, M.B. Camb. — MARION C. SMITH, M.B., B.Sc. Glasg.

ASSISTANTS, NEUROSURGICAL UNIT, ATKINSON MORLEY EMERGENCY HOSPITAL, WIMBLEDON

FRACTURES of the base of the posterior fossa of the skull involving the last four cranial nerves are very rare. The resulting syndrome, first described by Collett (1915), is due to damage to these nerves either by direct involvement in a fracture passing through the jugular foramen and the hypoglossal canal or by vascular disturbance—e.g., hæmatoma—in this region.

One of the many and variable symptoms which may be found is difficulty in swallowing, due to lesions of the glossopharyngeal and vagus nerves. There does not, however, appear to be any reference in the literature to a complete achalasia at both upper and lower ends of the œsophagus after injury to the base of the brain.

In the case reported here a depressed fracture of the posterior fossa, with an underlying extradural hæmatoma, was found. Clinically there was an almost complete Collett's syndrome together with other signs in the central nervous system due to an associated lesion of the medulla. Total and persistent dysphagia was the most prominent and disabling symptom, and radiography revealed a typical achalasia of both the cricopharyngeus muscle and the cardiac sphincter of the œsophagus. The most interesting features of the case are the dramatic response to treatment and the complex ætiological problem which this raises.

CASE-RECORD

A normal well-developed girl, aged 16½, was admitted to a general hospital on July 8, 1945, having been struck on the forehead by a falling wooden beam and knocked backwards to the ground. Apart from a few minutes in the ambulance, she remained unconscious for two days. A lumbar puncture was performed, and bloodstained fluid under low pressure was obtained. On recovering consciousness she was found to have a right hemiplegia and was unable to swallow. Fluids were administered by a drip.

She was transferred to this neurosurgical unit on July 18, ten days after the injury. On admission she was drowsy

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and spoke in a whisper. There was a large fluctuating swelling over the right frontal region and bruising of the left face and neck and round both orbits.

Examination of the nervous system showed:

Horizontal nystagmus; coarse to the right, fine to the left.
Deafness of left ear.
Right palatal paralysis; voice slightly nasal and weak.
Bilateral weakness of sternomastoid and trapezius muscles.
Protrusion of tongue to the right.
Right flaccid hemiparesis with right extensor plantar response.
Moderate hypo-algesia over left arm and leg.

There was total inability to swallow solids or fluids, which were expectorated with large quantities of frothy saliva. The patient indicated a point about 2 in. above the manubrium sterni where she felt that the food was held up.

Radiography of the skull showed a comminuted depressed fracture in the right occipital region.

Mr. Wylie McKissock operated on her the same day under general anæsthesia. Depressed bone was widely removed from the right cerebellar fossa, including about a third of the foramen magnum, which, together with the right hypoglossal canal, was involved in the fracture. A moderate extradural hæmatoma in this region was removed.

Her postoperative condition was satisfactory She was fed through an indwelling tube passed by the nasal route into the stomach. Lumbar punctures were performed daily for eleven days, with reduction of high cerebrospinal-fluid pressures until these were normal and the fluid was clear. Within a week her general condition had improved considerably. Laryngoscopy on Aug. 5 revealed normally functioning vocal cords, although she could still talk only in a low quiet voice.

During the next month power gradually increased in the right arm and leg, and sensation on the left side of the body returned to normal. She had been having physiotherapy daily, and this was continued throughout her stay in hospital. Her dysphagia, however, remained unchanged.

On Sept. 16, on the assumption that the dysphagia was purely hysterical, an attempt was made to induce normal swallowing by suggestion under intravenous 'Sodium Amytal.' The patient readily became suitably suggestible and euphoric. She took semi-solid food by mouth, chewed with relish, and appeared to swallow normally; but within a few minutes she quietly regurgitated all she had taken, mixed with much frothy saliva. This was repeated several times with the same result, and there was no evidence that any food passed into the œsophagus. Nasal feeding was resumed.

On Oct. 3 she was screened and radiograms were taken. This was done with the patient standing up; a barium mixture was poured into the nasal catheter, which extended only a few inches into the œsophagus. Radiologist's report:

> "With the tube in the œsophagus, the meal is held up at the hiatus diaphragmatica. On withdrawing the tube from the œsophagus, the constriction at the lower end of the œsophagus suddenly relaxes, and the meal passes into the stomach. When the patient attempts to swallow, the meal is held up at the entrance to the œsophagus. The appearances indicate an achalasia of the cricopharyngeus, and an achalasia of the cardiac end of the œsophagus."

It was therefore decided to attempt relaxation of the cricopharyngeus muscle and the cardiac sphincter with octyl nitrite. Four hours later, with the patient in bed, a capsule of octyl nitrite was broken, and she was allowed to inhale this cautiously for a few minutes. She complained only of slight dizziness, and there was no observable vasodilatation or alteration of pulse or blood-pressure. She was then given a cup of milk. The first few sips were swallowed with some difficulty and much salivation, but within a short time she was drinking fairly well. Thin slices of bread and butter were then eaten and swallowed normally, although mastication was rather laboured. Next morning she ate a full breakfast. By now she had lost her apprehension and had complete confidence in her ability to eat and drink. Her weight then was 5 st. 11 lb.; before the injury it had been over 7 st.

Five days later a barium swallow showed, on screening, a normally functioning œsophagus. From then onward she continued to eat with increasing ease and good appetite. She gained 9 lb. in the next week and went on gaining weight steadily.

The most recent neurological examination revealed the persistence of the following signs:

Cranial nerves.—Horizontal nystagmus, coarse to right, fine to left.
V. Impaired sensibility to pinprick over the area supplied by the second and third divisions of the trigeminal nerve on the right side of the face.
IX and X. Slight tilt of the uvula to the left, depression of palatal and pharyngeal reflexes on the right, and slightly nasal voice.
XI. Well-marked weakness of right upper trapezius and slight weakness of right sternomastoid muscles.
XII. Well-marked wasting and fibrillation of the right half of the tongue, which was protruded to the right.
Right arm.—Moderate flaccid weakness with gross postural ataxia.
Right leg.—Slight flaccid weakness.

The patient is now fast becoming more cheerful and alert; and, although she still shows slight general retardation compared with her personality before the illness, to the casual observer she is, both in appearance and behaviour, a normal girl.

DISCUSSION

The dysphagia, due to achalasia of the cardiac sphincter and of the cricopharyngeus muscle, was of sudden onset, immediately following unilateral damage to the reflex arc controlling deglutition (i.e., in the right side of the medulla, almost certainly from a traumatic thrombosis of branches of the posterior inferior cerebellar artery, and involving fibres of the right vagus and glossopharyngeal nerve).

It is tempting to postulate that the relationship of damage to achalasia was one of cause and effect. This is supported by the recognised occurrence of œsophagismus, or spasm in the course of the œsophagus, in bulbar palsy and tumours of the bulb (Abel 1929). However, there are some features in the case which render this explanation incomplete; in particular, the rapid recovery after inhalation of octyl nitrite. This drug, an antispasmodic with similar actions to amyl nitrite but with less unpleasant odour, has been used for chronic achalasia of the cardia with some clinical success (Field 1944). There is no reason to question that its sole action was directly on the smooth muscle of the sphincters, in which case the reflex arc must now have been sufficiently intact for deglutition to proceed normally, as indeed it did. There must therefore be further factors involved.

The significance of the psychogenic element in the ætiology of achalasia is recognised by many writers. In fact, we find the categorical statement: "cardiospasm is a psychosomatic disorder" (Weiss 1944). We believe that there is ample evidence here in support of this view.

Close observation of the patient and detailed questioning of her relations and friends showed that she underwent a pronounced change of personality, from which there is, so far, considerable but by no means complete recovery. Before the injury she had been a good-humoured girl of average intelligence with no overt signs of neurotic tendency. The post-traumatic picture was one of depression, retardation, and emotional flattening, and there was no appreciable improvement until she recovered her ability to swallow three months later. Her mental condition was such that at one time her dysphagia was seriously considered to be entirely hysterical. Although she was highly suggestible, repeated attempts to cure her by suggestion, including the use of an intravenous narcotic, utterly failed. Nevertheless, after three months' total dysphagia only one short period of inhalation effected an immediate and apparently permanent cure.

We conclude, therefore, that this girl was a striking example of a combined somatic and psychological disorder. A vicious circle initiated by physical damage, and largely perpetuated by emotional disturbance, was eventually broken, with complete restoration of function.

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SUMMARY

Fracture of the right cerebellar fossa with underlying extradural hæmatoma in a previously healthy girl of 16 years was followed by persistent and total dysphagia.

Attempts to cure the dysphagia by suggestion, including the use of intravenous sodium amytal, were unsuccessful.

Radiography revealed an achalasia of the cricopharyngeus muscle and of the cardiac sphincter of the œsophagus.

One ampoule of octyl nitrite was inhaled, with immediate and permanent recovery of normal swallowing.

It is suggested that a combined somatic and psychological disorder was present.

We wish to thank Mr. Wylie McKissock for his interest and advice, and for permission to publish this case; Dr. G. R. Mather Cordiner for carrying out the radiological investigations; Dr. J. St. C. Elkington for his helpful advice; and Dr. D. A. R. Pond, under whose care the patient was first admitted.

REFERENCES

Abel, A. L. (1929) Œsophageal Obstruction, London.
Collett, M. (1915) *Lyon méd.* **124**, 121.
Field, C. E. (1944) *Lancet*, ii, 848.
Weiss, E. (1944) *Psychosom. Med.* **6**, 58.

Medical Societies

ROYAL SOCIETY OF MEDICINE AND SCIENTIFIC FILM ASSOCIATION

AT a joint meeting of the society and the association on Feb. 26, with Dr. RONALD MACKEITH, chairman of the medical committee of the S.F.A. in the chair, a discussion on

The Place of the Film in Medical Education

was opened by Mr. G. PATRICK MEREDITH, lecturer in visual education in the University College of the South-West, Exeter, in a paper on the principles of teaching by film. To discover these, he said, we must know the aims of medical teaching. The medical teacher has, for example, to arrange for the student to have certain visual experiences during his training. In this the usefulness of the film is obvious; what contribution can it bring to the development of the other necessary qualities—understanding, skill, and attitude? The emphasis must always be on learning rather than on teaching, but the technique of using film will vary with the many different types of films. There are short "atomic" films and longer "molecular" films whose message is more than that of the sum of their parts, for there is a distinction between *additive* learning and *multiplicative* learning based on an integration of materials used. Teaching medicine by film is at present hampered by the haphazard supply of films. An overall plan for production must include the short "sentence" films which are more quickly made and more easily used, and the longer "chapter" films, both made to a coherent policy, to be used in a systematically constructed syllabus.

Lieut.-Commander A. C. IZOD, R.N.V.R., until recently in charge of production in the Royal Naval Film Unit, recalled that the early argument about the relative merits of story films and direct training films had ended in agreement that the second type were definitely better, though a polished production technique is essential, and the technique of instruction must be concealed. Projection must be in the usual classroom with good sound and a well-darkened room. In the Navy, instructors were always present when films were used, and, since many were untrained in teaching, training courses for teachers had been valuable. Many of the films were designed in conjunction with a special film-strip. He described an experiment on an air-station which had demonstrated the effectiveness of "attitude films" in producing a desired outlook.

Mr. W. MCADAM ECCLES, F.R.C.S., urged that we should get away from the dry bones of anatomy to the living film; he doubted whether production must necessarily entail great expense.

Instructor Commander J. A. BURNETT, R.N., emphasised the great contribution of the technical advisers in the making of naval instructional films. The Navy, after extensive experience, was convinced of the value of film-strip for teaching, even in comparison with the film; but film-strips must be planned and not just made from shots taken out of a film.

Prof. SAMSON WRIGHT, M.D., emphasised the value of film for integrating details into the whole, but said that the lesson films at present available do not fit into the scheme of medical teaching, though the brief "atomic" film can easily be used. The Physiological Society would give all the help it could in promoting the making of films.

Sir HENRY TIDY, M.D., said that, as with tribal lays, there are many right ways of making films. A new type of producer is needed. The most useful type of film is the short film and these must be made now.

Squadron-Leader H. MANDIWALL, M.B., asked how teaching by film could be learnt, and Mr. MEREDITH suggested that one should see all the films possible, judging each as a whole and in its parts, for a film-maker's ideas of integration are often different from the teacher's. One should list all the good sentence films (or portions of films) and use them. Good chapter films would come later from experience with sentence films.

Prof. ALBERT HEMINGWAY, M.B., said that one needs to have one's own library of films to get full benefit from films.

Dr. G. S. W. ORGANE pointed out the value of words to supplement visual teaching, and Mr. MEREDITH agreed that verbal skill is an important technique for doctors to learn. In conclusion Mr. Meredith said that the teachers must supervise the producers, and Commander IZOD added that it has been because they have been given too little lead by teachers that producers have had to go ahead and make films by themselves.

After a demonstration of the R.A.F. synchrophone the discussion was reopened by Mr. EDWARD HINDLE, SC.D., F.R.S., scientific director of the Zoological Society of London, who strongly opposed sound films for teaching. Films are especially useful for large classes, for showing rare intermittent movement or slow movement and to give background. Mr. H. R. HEWER, D.SC., of the Imperial College of Science and Technology, described the inception of the Gaumont-British series of biological teaching films. Their list of filmable subjects gave them a 20-year programme. In 5 years 24 films were made. No specialist producer was employed and the technical experts edited the films. In making films the audience must be kept in mind and only one theme dealt with in each film. They found that a detailed shooting script was not possible in dealing with biological material. The sound track was valuable, for it was carefully thought out and timed and of great assistance to biology teachers, many of whom were not expert biologists.

Squadron-Leader MANDIWALL mentioned the failures of films taken by photographers ignorant of the subject, and of films which did not deal with movement or which attempted to introduce humour. Something should be left to the imagination of the student. He emphasised the advantages of the silent film with spoken commentary.

Lieutenant F. R. KING, R.N.V.R., said that the "know-why" or essay film may last 10–30 minutes; the "know-how" and the "know-do" film should not last more than 5 minutes and may sometimes be better replaced by a film-strip.

MEDICAL WOMEN'S FEDERATION

AT a meeting of the London association of the federation on Feb. 5, with Dr. BERYL HARDING in the chair, an address on

The Care of the Chronic Sick

was given by Dr. MARJORY W. WARREN, deputy medical director, West Middlesex County Hospital, who recalled her experiences with this class of sick person in a public-assistance infirmary in the years before 1935. She did not wish to exaggerate the plight of these old people, for they were kept scrupulously clean and tidy, but she emphasised the complete lack of classification, which resulted in a failure to make a true diagnosis or to give adequate treatment. In the same ward were to be found senile dements, restless and noisy patients who required cot beds, incontinent patients, senile bed-ridden patients, elderly sick patients who were treatable, patients up and about all day, and unmarried mothers and infants. Among these cases, as the complete survey she made in 1935 showed, a good number of patients were treatable to the extent of getting home. Patients in the age-group

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60–65 years and upwards were inadequately catered for in the past, and much still remains to be done for them today. Excuses for such lack of attention in the past were probably to be found in the proportionately higher numbers of acute sick then treated in hospital, but the position today is entirely different. The medical profession, having done much to increase the duration of life of men and women, must not fail in their responsibility to these folk when they fall sick. The total number of men and women living in Great Britain over 60 years of age increased from 2,408,436 in 1901 to 6,327,000 in 1944. There are more women than men in all hospitals and institutions for the sick, unless they are especially selected, because of the higher average age in women, and the greater ease with which a man can usually be nursed at home by his women folk. It is obviously the aim in each case to return patients whenever possible to their home, but there are unfortunately a large number of these patients who for one reason or another cannot remain at, or return, home. The chronic sick can be divided into (*a*) those who can remain at or go home; and (*b*) those who cannot do so. The latter group can be classified as follows:

1. Those who are up and about—fit for a home with full freedom.
2. Those who are sedentary or partially ambulatory and would be happier in a home with suitable provision—e.g., operating lifts or bungalows, &c.
3. Chronic sick patients who must remain preferably in a hospital as opposed to a home.
   - (*a*) Those who need much help and little trained nursing and medical supervision.
   - (*b*) Those who need much nursing and some medical attention.
   - (*c*) Those who need full nursing and medical care, including sick patients; incontinents; patients who require some temporary restraint in cot beds, and segregation from general patients, owing to restlessness (early cerebral thromboses, &c.); and senile dements separate from certified patients.

Such cases should be treated as a special branch of medicine by a staff specially interested in the subject and possessing special knowledge of and sympathy with such patients. They should moreover be treated in specially built and equipped blocks of a general hospital and not in institutions separate from the general hospital unit. The reasons for this opinion were: (1) this branch of medicine forms an important subject for the teaching of students, and should form part of their curriculum; (2) the care of chronic patients should be an essential part of the training of a student and assistant nurse; (3) for the proper care and rehabilitation of these cases the full facilities of a general hospital are necessary, both for the establishment of a correct diagnosis and for treatment; and (4) to encourage research into the diseases which accompany advancing age. The so-called chronic hospitals or institutions for the chronic sick would not be provided with X-ray and pathological departments, a consulting staff, physiotherapists, almoners, and other ancillary staff, and patients would therefore inevitably lose in their treatment if relegated to such places. It seems reasonable to house long-stay elderly patients in a hospital in their own district, because their relatives and friends are often advanced in years and therefore find much travelling irksome. Dr. Warren described the misery and degradation of the patient whose case has been given up as hopeless, a state of affairs deplorable to the patient, distressing to the relatives, making a very heavy call on the nursing staff, and by this time devoid of interest to the medical staff. Adequate physical and psychological treatment of such cases could best be undertaken in the stimulating atmosphere of a general hospital, and by a full therapeutic team; with these conditions and an opportunity for research it is impossible to predict how much can be expected in the future.

Dr. HARDING suggested that there should be more coöperation between hospital almoners and the general practitioner with regard to the care of the chronic sick.

In reply to questions from other speakers Dr. WARREN explained that elderly arthritic patients are all seen by an orthopædic surgeon and given treatment, including physiotherapy, with the aim of rehabilitating them and enabling them to go to their own homes where possible; treatment is mainly directed to prevent stiffening of the peri-articular soft tissues.

Miss WESTON, lady almoner, suggested that institutions without stairs should be provided for elderly patients who are capable of getting about.

Dr. MARGARET DOBSON said that the rate of recovery of chronic sick patients is directly proportional to the enthusiasm of the doctor; this is especially true of elderly rheumatics.

Dr. A. M. THOMS suggested that an aftercare association should be formed for chronic sick patients.

Dr. LETITIA FAIRFIELD urged that ample accommodation should be provided so that these chronic patients could be segregated. Small voluntary homes within reach of large centres are immensely valuable for them. Occupational therapy is also important. The nursing staff tend to become too stereotyped in their management of chronic sick patients.

Reviews of Books

Problem Families

An Experiment in Social Rehabilitation. Editor: TOM STEPHENS. London: Pacifist Service Units. Pp. 72. 2*s.* 6*d.*

THIS report of work by the Pacifist Service Units in Liverpool, Manchester, and Stepney describes how these units undertook social repair and reablement of families that other organisations had found it impossible to reclaim. The approach was not specifically religious, nor even primarily charitable. The units, however, accepted responsibility as their brother's keeper. The entry to the family situation was always made through practical work—often directed to cleaning up the home, readjusting estranged families, and restoring self-respect.

The book is a modest account of a good piece of social observation, and the chapter on the approach to social work should be read by all entrants to this profession. It has a validity and sincerity which owes much to the difficult experiences described in the earlier chapters, which give sample case-histories, with illustrations. The essence of the work is seen as a personal relationship, optimistic but not sanguine, tirelessly patient, rejecting no situation as hopeless. The temptation to claim success in others' failures is written off. "Experiment is safest with those who have nothing to lose," but the authors admit their failures and recognise their limitations; "in rejecting the suggestion that any family could be abandoned as beyond redemption, they were giving expression to their fundamental belief in the value of the individual." The work has proceeded by trial and error, and this report, which is graphically and concisely written, must have behind it valuable records of a group of "social problem" families, seen as family units. It may be this consideration of the total situation that makes the report so interesting and convincing. It calls attention to the present widespread breakdown in moral and physical standards, and the uselessness of attempting repair at any single point until the family morale has been restored as a whole.

How completely time and money—whether from medical, charitable, or public sources—could have been wasted on any of the cases described and brilliantly illustrated in this report! One wonders how far out-patient services in our big towns make any effective change in the patient's life; for good advice becomes inappropriate unless adjusted to a known home setting. This booklet should be bought and read by anyone who professes to consider social background; and which of us can afford not to do so?

IN a letter to the Parliamentary and Scientific Committee, Mr. Glenvil Hall, financial secretary to the Treasury, states that the Government intends to provide in the Civil Service a career for scientists equal to that of other staffs of comparable quality. "So far from accepting the view that the scientist is inferior to the administrative officer," he writes, "its aim is to ensure that scientific workers will, man for man and job for job, be in as good a position as other staff. Provision is being made for a 'pool' of senior posts to which individuals may be appointed on their own merits as scientists, and independently of the number of such posts required for the normal work of the department or research establishment in which they serve."

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THE LANCET

LONDON: SATURDAY, MARCH 16, 1946

The Sickness of India

THE comparative pathology of England and India reveals distressing contrasts. Within our own communities we must admit to very considerable divergences in the rates of sickness and death as between the more and the less privileged classes. Infant mortality and the deaths from tuberculosis and rheumatic heart disease, in particular, remain heavily weighted against the poorer social groups. But the correlations between sickness-rates and bad social conditions are far more, and more terribly, manifest in India, where many diseases flourish which have long since been reduced or banished in the Western world.

The health and sickness experience of peoples is related in part to their geographical situation and climate, but much more intimately to prevailing social circumstance. To some extent we have blinded ourselves to the hygienic problems of India and the East and Africa by the uncritical use of the word "tropical" in association with their main and most widely lethal diseases. We should remember that plague, cholera, typhoid fever, the bacillary dysenteries, leprosy, malaria, hookworm disease, and the nutritional maladies have all occurred and even taken heavy toll—some of them less than a century ago—in the temperate climate of our own islands, before the poverty, squalor, ignorance, and defective sanitation which favour them had been brought under control. For all of these diseases social and economic and immediate environmental factors, and not geography and climate, should be chiefly blamed. Within living memory, the Philippines have been largely relieved from epidemic scourges by recognition of their basic causes and by vigorous application of Western methods and experience. India's health and prosperity still await the wide application of common existing knowledge. But sanitary science and laws will be incompetent without the simultaneous advancement of agriculture, of university and popular education, and of administrative efficiency. For only a small fraction of her 400 million people—90% of whom are poor peasants—can enjoy the accepted decencies of home life, safe water, and sufficient food. The pressure of population, which in spite of a stupendous death-roll is increasing by some 5 million every year, greatly complicates the problem. Some of the relevant factors of the situation have been clearly set forth in our own columns by Lieut.-Colonel J. N. MORRIS,[1] and in *The Health of India*[2] by Dr. J. B. GRANT. These and other publications have now been greatly amplified and supplemented by the report of the Health Survey and Development Committee of the Government of India.[3] This committee, appointed under the chairmanship of Sir JOSEPH BHORE in 1943, was given the widest terms of reference and has conducted an extensive and painstaking survey of British India. No aspects of the health problem have been neglected in its voluminous report.

1. *Lancet*, 1945, i, 743.
2. Oxford Pamphlets on Indian Affairs, no. 12.
3. Report of the Health Survey and Development Committee. Government of India Press, New Delhi. 1946.

The expectation of life at birth in British India is estimated at 26·9 years (males) and 26·5 years (females), as compared with 58·7 and 62·8 (before the war) in England and Wales, and 65·0 and 67·8 in New Zealand. The infant-mortality rate in 1937 in India was 162 per 1000 live births; in England and Wales 58 (with a notable further fall during the war); and in New Zealand 31. Nearly half the total annual deaths occur in children under 10. The maternal deaths in British India alone are estimated at 200,000 per annum. At least 100 million persons suffer from malaria every year and, directly or indirectly, over 2 million die from the disease. Tuberculosis is prevalent and increasing. Hookworm disease is widespread. Venereal disease and leprosy remain respectively a universal and a more regional scourge. Chronic malnutrition (quite apart from periods of acute famine), leading in its later stages to anæmia, osteomalacia, rickets, œdema, and goitre, and lowered resistance to the infective diseases, is in most provinces an ever-present problem. The average annual deaths in a population of some 300 million (British India) from cholera, smallpox, plague, fevers, dysenteries, respiratory disease, and other causes between 1932 and 1941 was over 6 million.

Illiteracy delays reforms, while child marriage, purdah, and other social customs and traditions complicate the situation and encourage many kinds of disease and disability. The ratio of doctors to population is given as 1 to 6300, but their distribution is very uneven, and there is a concentration of medical men in the towns, where alone proper amenities and a living wage are available. Salaried medical and ancillary personnel, especially in the rural areas, are grossly underpaid. The ratio of nurses to population is given as 1 to 43,000; of midwives as 1 to 60,000; of health visitors as 1 to 400,000. Medical colleges and schools and hospitals are inadequate in number and usually ill equipped for the provision of an up-to-date medical or nursing education. The teaching of preventive medicine to the undergraduate student is of the sketchiest. With all these deficiencies, it is not surprising that the indigenous practitioners are in popular demand, and that the unhygienic village *dais* assist the high maternal death-rate. Although there are several government research institutes of wide repute, they work in detachment from the medical colleges and schools. These in turn work largely in detachment from other university departments, and with rare exceptions make little or no contribution to research.

It would take too long to consider here the development and the manifold difficulties of central and provincial health administration in India, but the Bhore Committee gives careful consideration to this important aspect of the inquiry. It should be noted that Madras Presidency alone of the eleven governor's provinces of British India has a Public Health Act.

And what of the recommendations for the future? The committee has wisely divided these into two categories—those concerned with a short-term policy to be initiated during the next ten-year period, and those concerned with long-term planning and the gradual attempt to draw more nearly abreast with modern knowledge, the applications of modern teaching and research, and what is best in the health administration of other countries. The recommendations cover administration, social medicine and

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hygiene, medical relief, medical education and research, ancillary services, nutrition, water-supplies, industrial health, and many subsidiary problems. Where the general community service is concerned, it is wisely considered that the functions of preventive and curative medicine should be combined in every doctor, and that the service should be whole-time and salaried. For the provincial services in the first ten-year programme, three types of organisation are described, which would be based on (*a*) primary, (*b*) secondary, and (*c*) district health units, each serving both remedial and public-health purposes. In addition, special services or measures are proposed for malaria, tuberculosis, venereal disease, leprosy, mental disease, maternity and child welfare, school health, and nutrition. The importance of field surveys and of field training centres for medical and subordinate health workers is stressed. The enrolment of small village committees to assist in the health arrangements and instruction provided for their own communities is also commended. The necessity for coöperation between the health departments and other departments of government is recognised in the report. At present, there is all too little appreciation of the essential interdependence of health planning and other planning for food-production, education, industry, and other reforms which are envisaged.

Having regard for the existing shortage of medical and ancillary personnel, and the present state and orientation of medical teaching and public thinking, it is very difficult to see how the short-term recommendations are to be fulfilled, even if the benefits proposed are at first, geographically or otherwise, considerably restricted. It may be well to set a high target, but promises succeeded by disappointments may bring ill effects in their train. Whatever governments assume control in the near future, whether at the centre or in the provinces, a stupendous task awaits them in connexion with the reorganisation of their medical and health services. The whole future of India is at present menaced by the sickness of her peoples, and in no department of reorganisation could there be a stronger case for coöperative action, for generous financial provisions, and for international assistance. Without improved health other reforms may be unproductive. Without other reforms the people's health may not be advanced. Help at all levels, from within and without, will be sorely needed for this great but overshadowed land in her new era and projected experiments. Extended and much improved facilities for Indian postgraduate students should be offered in this country at the earliest possible date. The committee indulges in one particular vision which should be worthy of special consideration—that of an All-India Medical Institute, to be devoted primarily to the training of teachers and research workers. Of these there is a serious shortage throughout India. It must never be forgotten, however, that there have been many distinguished officers of the Indian Medical Service who, by their scientific researches or administrative ability, have made great contributions to knowledge or given necessary directives for progress. The tragedy of the lag between pioneer work and its applications is seen today in all its stark reality.

It is to be hoped that volume IV in particular of the Bhore Committee's report, which summarises the findings and recommendations contained in volumes I and II (volume III consists of appendices), or even a shorter abridged version, will be made widely available throughout India and the British Commonwealth and elsewhere. India's health problem is a world problem, too vast for domestic solution. It cannot be isolated or ignored by other nations.

Spread of Poliomyelitis

FOR many years after WICKMAN,[1] in 1907, demonstrated that poliomyelitis was spread by cases and carriers, the prevalent teaching was that dissemination occurred by droplet infection. Later American workers[2] confirmed the findings of KLING and his colleagues in Stockholm[3] that the virus could be recovered from the fæces of infected persons and abortive cases, and attention has since been turned to the part played by food, water, and the other usual vehicles of intestinal infection in the spread of the disease. In the recent war, SEDDON and his co-workers[4] decided that the severe epidemic of 1942–43 in Malta could best be accounted for by droplet infection. In India, on the other hand, the high incidence among officers as compared with other ranks (whose culinary arrangements tend to be more hygienic if less appetising) led MCALPINE[5] to attribute infection to fæcal contamination of food. These findings suggested some practical measures for limiting the spread of infection.[6]

Further American investigations have thrown welcome light on the problem. During an epidemic in 1941 in Alabama, CASEY[7] found evidence that the infectious period was from 3 days before to 3 days after the onset of prodromal symptoms; that the incubation-period could vary from 4 to 35 days; and that in 80% of cases the route of infection was by patient-to-patient contact. More recently he has published confirmatory findings derived from sporadic cases in Chicago.[8] The methods used involved a minute study of the contacts, neighbours, and environments of several isolated cases by a trained staff of field epidemiologists. When the diagnosis of each of these cases had been confirmed, histories of the recent habits, associates, and illnesses of all people under the age of 25 living in the same block as the patient were compiled. A division could be drawn between those whose association with the patient in play or through family contacts was close ("contacts") and the remainder of the neighbours in the same age-group ("non-contacts"). As a further control a similar group was investigated in a distant block in the city where no case of poliomyelitis was known to have occurred. Illnesses were classified as poliomyelitis, "compatible with poliomyelitis," and unrelated ailments. Among 66 contacts, 37 were found to have developed diseases of the second group, and 24 were diagnosed as cases of poliomyelitis; 22 of these were

1. Wickman, O. I. Beiträge zur Kenntniss der Heine-Medinschen Krankheit, Berlin, 1907.
2. Trask, J. D., Vignec, A. J., Paul, J. R. *J. Amer. med. Ass.* 1938, **111**, 6. Trask, J. D., Paul, J. R., Vignec, A. J. *J. exp. Med.* 1940, **71**, 751. Trask, J. D., Paul, J. R. *Amer. J. publ. Hlth*, 1941, **31**, 239.
3. Kling, C., Petterson, A., Wernstedt, W. *Commun. Inst. méd., Stockh.* 1912, **3**, 5.
4. Seddon, H. J., Agius, T., Bernstein, H. G. G., Tunbridge, R. A. *Quart. J. Med.* 1945, **14**, 1.
5. McAlpine, D. *Lancet*, 1945, ii, 130.
6. Leading article, *Lancet*, 1945, ii, 278.
7. Casey, A. E. *J. Amer. med. Ass.* 1942, **120**, 805; *Amer. J. Dis. Child.* 1945, **69**, 152.
8. Casey, A. E., Fishbein, W. I. *J. Amer. med. Ass.* 1945, **129**, 1141.

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confirmed by examination of the cerebrospinal fluid. Among 109 non-contacts in the same block there were 4 cases compatible with poliomyelitis, and among 115 controls there were 5; in neither group was there a confirmed infection. Within the family, multiple cases were the rule rather than the exception, and in the age-group 1½–3½ years it was estimated that the infection-rate might reach 90%. There was no evidence in the Chicago cases to incriminate either food or flies in the spread of infection. An epidemic of 1083 cases occurred in Buffalo in 1944. The first paralytic case was seen at the end of May, but SMITH and others [9] demonstrated that infections uncomplicated by paralysis had been arising with increasing frequency during the previous two months and that the first of these had been preceded by sporadic cases in the area derived apparently from the end of the seasonal wave of 1943. Non-paralytic cases outnumbered paralytic ones by about 5 to 1 and not only began earlier but persisted later. It is thus evident that our conception of an epidemic of poliomyelitis must be extended to cover the preparalytic and post-paralytic periods.

A rather different approach was adopted by PEARSON and RENDTORFF with their associates.[10] Starting with isolated sporadic cases in a rural area, the virus was searched for in the excreta of members of the affected family and others with whom the patient had had social contact; in one case specimens from 38 out of 39 households in a village were examined. In view of the suggestions that infection might be derived from some non-human source or vehicle, the examination was extended to the fæces of domestic animals of all kinds, to flies and mosquitoes, and to milk and water. (In many cases the sanitary conditions enjoyed by these communities were frankly poor.) The positive findings were few in number and limited to some close human contacts of the patients. The next inquiry was on the same lines in a township of 1300 people where two cases had occurred. Here it was possible to examine the excreta of nearly all the children under 16 in the community. The two cases did not appear to have any connexion with one another, and no virus could be found in any of the family or friends of the first case. The second patient lived at the opposite end of the town, and in this area the children in eight other families were found to harbour the virus. All but one of these families had been in social contact with the second case, and virus was also found in the fæces of some cousins from elsewhere who had paid a visit during the week before the patient developed symptoms. (Social intercourse was evidently far greater in this town than in the rural community studied earlier.) Lastly, the same methods were applied in Fort Worth, a town of 200,000 persons, during an epidemic that produced 102 diagnosed cases. Fæcal specimens from 75% of households where paralytic cases had occurred yielded virus, whereas the figures for non-familial contacts and non-contacts were 18% and 1·6%. In 5 out of 6 households where cases had occurred the virus was recovered from adults. No virus could be found in rats, insects, water, or sewage, but an unknown virus was found in rats in a part of the town remote from any reported infection. The weak link in the evidence in all three inquiries is the unknown efficacy of the technical methods employed in isolating the virus. Nevertheless the figures obtained for the interfamilial spread of infection are striking enough and of the same order as those found by CASEY on clinical evidence.

There does not seem to have been an investigation on these lines in England, but CONYBEARE'S account [11] of a small outbreak contains several suggestive similarities. Of 30 boys who had been camping together, 9 developed poliomyelitis; 8 of these had had premonitory symptoms 8–29 days before paralysis set in; 6 boys who did not develop clinical poliomyelitis also experienced mild malaise during the same period. About the same time as the 9 boys developed clinical poliomyelitis the sister of another boy who had been in camp but had had no symptoms was found to be infected. This experience fits in well with CASEY'S findings, but it seems that the next step in any investigation must involve recovery of the virus. On the analogy of another intestinal infection, Sonne dysentery, it might be worth while in any future epidemic to search for the virus on the hands of those who are carrying it in their intestines.

Information derived from experimental infection of apes with poliomyelitis has sometimes been misleading when applied to human infections. But the experimental findings of LEVINSON and his colleagues [12] have confirmed some old-standing clinical observations. Trauma to one or more limbs during the incubation-period had no effect on the degree of paralysis in infected apes (*Macaca mulatta*). But fatigue or chilling at that time increased the severity of paralysis compared with that in control animals, and infection produced a significantly more severe paralysis during the summer months than in the winter. Poliomyelitis is a summer disease—in its paralytic form at any rate—and the findings of SMITH and others suggest that this is an indication of a far greater incidence of non-paralytic cases during the same season. They point out that it is during the summer that children are particularly likely to engage in over-strenuous exercise. This is also the season when young people most appreciate the pleasures of sudden chilling in cold water, and in the rural surveys of PEARSON and RENDTORFF a history of bathing was often elicited from cases and contacts. Playing with other children and family visiting too are probably commoner then than in the winter. But the experiments with apes suggest that the heat or humidity of summer has some favourable effect on the virulence of poliomyelitis without relation to the activity of its victims. That fatigue and chilling were liable to "cause" poliomyelitis has been suspected by neurologists for some time, and it is possible, on the analogy of the experiments of BOYCOTT and PRICE-JONES [13] on infection of rats with *Bact. enteritidis*, that the effect is to convert a subclinical into a clinical infection.

The advice on control measures that we summarised last autumn [6] is in no way invalidated by these findings. It may be that adults are more dangerous

9. Smith, M. L., Bridge, E. M., Underwood, H. E., Dale, G. E. *Ibid*, p. 1150.
10. Pearson, H. E., Rendtorff, R. C. *Amer. J. Hyg.* 1945, **41**, 164, 179. Pearson, H. E., Brown, G. C., Rendtorff, R. C., Ridenour, G. M., Francis, T. jun. *Ibid*, p. 188.
11. Conybeare, E. T. *Mon. Bull. Min. Hlth*, 1946, **5**, 15.
12. Levinson, S. O., Milzer, A., Lewin, P. *Amer. J. Hyg.* 1945, **42**, 204.
13. Boycott, A. E., Price-Jones, C. *J. Path. Bact.* 1926, **29**, 87.

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as transmitters of infection than was thought, and there is little doubt that isolation when put into practice must be of the strictest and extended to outdoor as well as indoor contacts.

Autopsies for the Coroner

IN a coroner's court a general practitioner lately protested against having been called on to perform an autopsy which he claimed required the skill and experience of a competent pathologist.[1] The examination had proved difficult, and in spite of the help of an analyst the court was left in doubt as to the precise cause of death. The coroner explained that the nearest pathologist was many miles away and that it seemed unreasonable to ask him to make a special journey when there were several doctors already in the town.

Many coroners lack a medical qualification, so they may be excused if they do not always appreciate the difficulty which even a skilled pathologist may find in explaining a death in terms of pathology. It is the coroner's business to find out whether the subject of the inquiry has died a natural or unnatural death; he is not interested in the pathological process which has been at work. But by now there cannot be many coroners who still believe that it requires "just a peep inside" to determine the cause of death. Gross changes in morbid anatomy may call forth a whistle of exclamation from the attending constable, even if his previous experience of pathology has been confined to casual acquaintance with the nearest abattoir; but the telltale pin-head subintimal hæmorrhage in the branch of an atheromatous coronary artery, or the sinister fleck of curd on the larynx of an overfed infant, call for skilful observation founded on long experience. It is understandable why the Home Office departmental committee on coroners recommended ten years ago that "autopsies should be undertaken by pathologists with special experience in that class of work," adding that "this must apply to all post-mortem examinations made at the request of coroners"; the pity is that so few coroners seem to be familiar with this recommendation. But the coroner must retain his full freedom and employ anybody he wants. It must never be laid down that a coroner is under an obligation to employ any one medical practitioner, be he a pathologist or not. Neither is it desirable that the coroner's powers of direction as laid down in the Coroners Act of 1887, and in the Coroners (Amendment) Act of 1926, should be repealed, for circumstances might arise when no doctor could be found who would be prepared to carry out an autopsy. Under this Act the coroner can summon the doctor who attended the deceased at the time of death, or if the deceased had not before death been attended by a doctor he can summon a practitioner in or near the place where death occurred. It has apparently never been decided whether a pathologist residing or practising ten miles away is "a practitioner near the place where death occurred," but the Act of 1926 enables coroners to request specially qualified doctors to perform post-mortem examinations and report to them. Such a specially qualified doctor is of necessity a pathologist, and there are few parts of the United Kingdom where the services of such a person are not within reach. The pathologist who is to be found at every reputable hospital of importance is a proper person to undertake the ordinary run of coroner's work, but for the case which has or may have criminological repercussions the services of a pathologist specialising in forensic work are desirable. These men are scarce, and are to be found in the larger centres only; but their special experience of crime detection and the vituperations of opposing barristers fits them for this important work, where justice, in its quest for retribution, may demand the lives of citizens. The general practitioner who objected to being called on to perform an autopsy was therefore correct in his contention and is to be congratulated on the courageous way he spoke out in public. Too often in the past a general practitioner has embarked on a cursory examination without declaring his lack of experience.

The coroner had good reason for acting as he did. He did not want to bother a pathologist whose day he probably knew to be full. It was a long way for the pathologist to come; and his examination would cost the local authority more than one by a local man. The coroner's views, however, commendable though they are, emphasise the need for drastic revision of the present attitude of some coroners and local authorities. Why should not the body have been sent to the post-mortem room in the pathologist's hospital? Bodies can be moved from the area of jurisdiction of one coroner into that of another by mutual arrangement. The reason no doubt was that of expense, for until he is reimbursed by the local authority a coroner must pay fees like these out of his own purse; and because a pathologist's charges and travelling expenses are curtailed by statute it is cheaper to invite a pathologist to move over with his assistant and all the equipment of the post-mortem room than to hire an undertaker to move the body to the pathologist's hospital. This is a lamentable state of affairs and shows how little value is attached to an autopsy by some local authorities who should know better. The difficulty might easily be overcome if local authorities asked undertakers to tender for this class of work. Within an hour or two of the body being brought to the hospital, the pathologist will have completed his examination and the corpse will be on its way back to the parish mortuary or lying in the hospital mortuary awaiting the completion of burial arrangements. Under this plan pathologists would no longer have to work, as they are sometimes expected to do, in sheds adjoining pig-swill plants or knacker's shops, in frigid barns, or in blacked-out outhouses of corporation yards.[2] A wise pathologist will refuse to work in a post-mortem room which is not equipped with a good north light, running water, and adequate ventilation and heating. The hospital post-mortem room possesses the additional advantages of proper equipment, bone saws, and access to laboratories and X-ray plant. Under these conditions not only will the pathologist make a more satisfactory examination but he will be spared time-consuming and *tiring* journeys.

The objections which have been raised are all surmountable. First, it may be distressing for relatives to know that the body of a dear one is being

1. *Western Morning News*, Feb. 2, 1946.

2. *See* In England Now, *Lancet*, 1942, i, 237.

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moved. But if they realise that an examination is necessary would they not want it to be done properly in respectable premises? Secondly, the doctor in attendance may want to see the autopsy. In practice he seldom has the necessary time, but if he has he will not object to visiting the hospital. The pathologist will preserve the specimens for him to see later if he wishes, and with the coroner's approval will furnish a copy of the report. Lastly, will the hospital authorities welcome an additional stream of hearses invading their premises? An enlightened committee will not object to a scheme which lightens the load on their pathologist while making his work more effective.

Annotations

TREATMENT OF PETIT MAL

EVERYONE who has been responsible for the treatment of epilepsy has noticed that results vary in individual patients, and that attacks which are different in their clinical patterns also differ in their therapeutic response. Petit mal in particular shows a resistance to drugs which is not shared by other types of epilepsy. Lennox [1] has again emphasised the fundamental difference between the three main groups of epileptic disturbance—petit mal, grand mal, and the psychomotor attacks. He points out that petit mal differs from the other types in the time of onset, course, and response to physiological changes. He also asserts that petit mal, as he defines it, is rarely if ever a symptom of gross cerebral damage—it is a constitutional disorder. With all this there is fairly general agreement. One of the most striking differences between the clinical forms of epilepsy is seen in the electrical accompaniments of the attacks recorded in the electroencephalogram, and it is on these changes that Lennox makes his most distinct differentiation of the types of epilepsy.

The term petit mal was originally used to describe any small attack, in contradistinction to grand mal—minor and major epilepsy in the English tongue. Now, thanks largely to the evidence of the electroencephalograph, petit mal itself has been divided into different types which have distinct electroencephalographic and clinical features, so that for want of a more scientific terminology one refers, for example, to "pure petit mal" as opposed to "small grand mal." The difference between these two conditions may be trivial to the clinical observer, but is extreme when their electrical counterparts are studied in the electroencephalogram, and the distinction must be made whenever possible, for the treatment of choice for each is different. It was a pity that the old-established, inadequate, clinical terminology was applied by the American workers to the electroencephalographic changes which seemed to accompany the different kinds of attack, for this has caused some confusion and misunderstanding. Lennox tries to get around the difficulty with neologisms, and even uses the synonyms "petit mal, pyknolepilepsy, and dart and dome dysrhythmia" in an attempt to link the old and the new; but it is time that the whole question of classification and nomenclature in epilepsy was re-examined by a group of authorities whose recommendations would be generally acceptable.

Lennox recognises three clinical types of petit mal as seen in the electroencephalogram—a disturbance associated with alternating fast and slow waves (wave and spike complexes). These are "pure" petit mal, in which there is simply loss of consciousness; myoclonic epilepsy with muscular jerking; and akinetic epilepsy, in which there is a sudden loss of postural control. Besides the similar kind of disturbance which these attacks cause in the electroencephalogram, they have other common features which include their failure to respond satisfactorily to the accepted methods of treating epilepsy. Their response to bromides and phenobarbitone is not good, and the hydantoins are usually ineffective. On the other hand caffeine and amphetamine, which have no value in other epileptic disorders, produce some improvement. Lennox has found that a drug, 3, 5, 5-trimethyloxazolidine-2, 4-dione, which is shortened to tridione, has given better results than any other he has used. His claims are still tentative, for he has treated only 50 patients for periods of 2–15 months, and he reports the results in only 40 of these. All these 40 patients showed spike and wave complexes in the E.E.G., and, he says, "practically all of the group had been given the usual anticonvulsant drugs without benefit"; 11 of the group are now free from attacks, and in 21 the average number of attacks has fallen to a quarter or less of its former value. In every patient there was some improvement, but in 2 the drug was stopped because of toxic effects. There is a suggestion from the results that attacks do not return when treatment ceases, but since petit mal attacks tend to disappear with age and to vary in their frequency, this may be the result of chance. The present report is a preliminary one, but it suggests that at the very worst tridione will repay careful and extended trial.

REDUCED RATIONS FOR GERMANY

THE Minister responsible for the British zone of Germany, Mr. John Hynd, is reported as saying last Sunday that unless 150,000 tons of food arrive before the end of the month the daily ration will not be 1000 calories but 700 or even 450. And it is impossible, he thought, to move the 150,000 tons in time; the most that can go to Germany is 30,000 tons. In view of the dangerous situation that is evidently developing we should like to be assured at least that any failure to avert "mass starvation in the next six weeks or two months" among the 23 million inhabitants of the zone will be due to physical causes and not to a state of mind which will later be regretted. Some of the statements so far made are not reassuring in this respect. Field-Marshal Montgomery, who was not perhaps in possession of the latest information, said on March 8: "I have had to reduce the German rations to 1000 calories per head, compared with 2800 in this country. We will keep them at 1000. The Germans gave the inmates of Belsen only 800 calories." He added that "for years and years the Germans have lived very well indeed and I would not take any food from England in order to feed the Germans, nor will there be any taken. . . . We are looking after the children, but the big overgrown Germans have got to tighten their belts." [1] His deputy in Germany, Sir Brian Robertson, is credited with the remark that although Britain considers that the Germans should be adequately fed, this is not because she is sorry for them but because it is "a matter of policy." Certainly there are ample political grounds for preventing starvation in the British zone in Germany; on a diet yielding under 1000 calories the population could do little work and would further depend on our support. But if the people of this country were made to understand the world of difference between our present monotonous diet and a Belsen standard (plus or minus a couple of hundred calories), they would surely remember that there are other reasons too. Mr. Victor Gollancz [1] is right when he sees some recent public utterances as examples of "that contempt for mercy and that glorification of self-interest and expediency which are rapidly becoming the new morality, and which are an utter denial of the teachings of Christianity and of Judaism before it." The habit of thinking about people in almost meaningless abstractions—of "the Germans"

1. Lennox, W. G. *J. Amer. med. Ass.* 1945, **129**, 1069.

1. *Manchester Guardian*, March 9.

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and "the Jews" rather than of individual human personalities—is, as he says, a menace to civilisation. It was a characteristic habit of our enemies, and we should take no pride in acquiring it.

RATS, MITES, AND STRATEGY

AMONG the useful observations made by the typhus research team operating with the Fourteenth Army was a confirmation of the patchiness in distribution of the trombiculid mites responsible for transmitting *Rickettsia orientalis* which had been noticed previously in Malaya,[1] New Guinea,[2] and Sumatra.[3] The mites seemed to be limited to certain areas and in particular to tracts that had been under cultivation and were now relapsing into jungle. So accurately could this "typhus country" be defined that the risk of infection could be foreseen fairly accurately from aerial photographs. The "roads" that led south from the Kohima plain over the hills into Burma were scattered with the notice TYPHUS AREA, with sundry prohibitions against entering these mite-infested tracts. Another example of the local occurrence of this disease was the case whose infection could have been derived only from within the purlieus of Fort William, in the middle of Calcutta and at least five hundred miles from the nearest known endemic focus. The typhus research team has not yet published its findings, of which these will form a very small part, but the Typhus Commission of the U.S. War Department has recently published a comprehensive review of tsutsugamushi disease (as they have preferred to name it) in the light of the experiences of the forces engaged in New Guinea.[4]

Allowing for differences in flora and fauna, there is little in this account which could not have been applied to scrub-typhus in all its aspects as they were seen in Assam and Burma. One striking finding is the wide variation not only of infection-rate in different localities but also of mortality. There is, as yet, no evidence that there are differences in the virulence of local strains of rickettsia, but members of the Typhus Commission found that there was considerable variation among localities in the number of rickettsiæ that could be recovered from the local trombiculids (mainly *T. fletcheri* and *deliensis*). Findings on the mainland of New Guinea seemed to suggest that the area of greatest infectivity was where the mite-rat-mite passage was most easily effected. The fortune of war, blindfold as usual, that led to the occupation of South Bat Island (Lat. 2° 50′ S; Long. 146° 14′ E) in the Purdy Group not only brought some evidence in support of this thesis but provided a warning of the devastating possibilities of this disease.[5]

South Bat Island, to judge from description and photographs, is the desert island of fiction, covered with coconut palms and uninhabited except by a few pigs, some flying foxes, and a saturated population of rats. These last were remarkable not only for their numbers and their lethargy but also for the fact that *Rickettsia orientalis* was recovered from each of the samples of mites taken from them. Before the war the island had been visited by natives from the neighbouring islands who harvested the nuts; for reasons unknown but easily guessed they refused to live there. There was a story that the agent of the plantation owner had settled there for a short time and had been carried away delirious and dying. Of the forty-one soldiers and sailors who formed the occupation force in 1944, twenty-six contracted scrub-typhus within 46 days and two died. The occupation was abandoned, and it is clear that strategy in the S.W. Pacific presented other difficulties besides those of pure logistics. But it is a grievous loss to medical literature that Hans Zinnser was not spared to extend to *R. orientalis* the honour that he gave[6] to *R. prowazeki*.

1. Fletcher, W., Lesslar, J. P., Lewthwaite, R. *Trans. R. Soc. trop. Med. Hyg.* 1928, **22**, 161
2. Gunther, C. E. M. *Med. J. Aust.* 1940, ii, 564.
3. Walch, E. *Kitaso Arch.* 1924–25, **6**, 235; 1925, **29**, 420.
4. Blake, F. G., Maxcy, K. F., Sadusk, J. F. jun., Kohls, G. M., Bell, E. J. *Amer. J. Hyg.* 1945, **41**, 243. Kohls, G. M., Armbrust, C. A., Irons, E. N., Philip, C. B. *Ibid*, p. 374.
5. Philip, C. B., Kohls, G. M. *Ibid*, 1945, **42**, 195.

SUCCESS IN BACTERIAL ENDOCARDITIS

IT is just over a year since the Medical Research Council announced that they were instituting a trial of penicillin in subacute bacterial endocarditis. At that time, though there had been some striking successes, the results had not been definite enough to justify a vast expenditure of penicillin while supplies were limited. Since then a coördinated investigation has been carried out at 14 university centres, and Prof. R. V. Christie, who supervised the trial, describes in this issue the experience with the 147 cases treated up to September, 1945. Of this series, 81 have been apparently cured—i.e., there has been no relapse during a follow-up period of at least three months—and if one excludes the 46 cases which received less than the dosage now recommended the recovery-rate is raised from 55% to 70%. These remarkable figures clearly justify the use of penicillin in all cases as soon as the diagnosis is established, particularly as penicillin is now becoming plentiful. The course recommended is 500,000 units a day for four weeks.

It soon became apparent in the M.R.C. trial that duration of treatment is more important than the total amount of penicillin—"Increased dosage is no substitute for long treatment"—though massive dosage is still required. Similar conclusions have been reached in the United States. After initial disappointments,[7] encouraging results were reported,[8] though with a relapse-rate up to 50%. Now with bigger and longer courses the rate of apparent cure in series followed up for an average of six months has risen to 73–81%.[9] Bloomfield and Halpern[10] have treated a consecutive series of 18 patients followed for 3–17 months with an incidence of recovery, judged on bacteriological and clinical grounds, of 100%, but this group was selected in that all were infected with strains of streptococci which were highly sensitive to penicillin in vitro. Christie finds little evidence that the organisms become resistant during treatment, but the possibility that this may happen through exposure to sublethal doses of penicillin has been demonstrated experimentally[11] and there can be no excuse for adopting an inadequate dosage. There is a surprising lack of correlation between the in-vitro sensitivity of the organisms and the therapeutic response, and no patient should be excluded from treatment with penicillin on such grounds. Where highly resistant bacteria are isolated both the daily dosage and the length of the course should be increased. Loewe and his co-workers[12] have lately isolated an apparently new variety of non-hæmolytic streptococcus, "Streptococcus s.b.e.," which they think is chiefly responsible for their cases which fail to respond to penicillin and heparin. For this infection they give at least 2 million units of penicillin daily by intravenous injection, together with heparin, for eight weeks. There is experimental evidence[13] that heparin will arrest the deposition of blood-platelets and fibrin which forms a protective nidus for bacterial growth, and that thrombi can be actually dissipated by

6. Zinnser, H. Rats, Lice and History, London, 1935.
7. Keefer, C. S. et al. *J. Amer. med. Ass.* 1943, **122**, 1217.
8. Dawson, M. H., Hunter, T. H. *Ibid*, 1945, 127, 129; Meads, M., Harris, W. H., Finland, M. *New Engl. J. Med.* 1945, **232**, 463; Anderson, D. G. *Ibid*, p. 423; Spink, W. W. *Arch. intern. Med.* 1945, **22**, 510.
9. Flippin, H. F., Mayock, R. L., Murphy, F. D., Wolferth, C. C. *J. Amer. med. Ass.* 1945, **129**, 841; Bloomfield, A. L., Armstrong, C. D., Kirby, W. M. M. *J. clin. Invest.* 1945, **24**, 251; Loewe, L. *Bull. N.Y. Acad. Med.* 1945, **21**, 59.
10. Bloomfield, A. L., Halpern, R. M. *J. Amer. med. Ass.* 1945, **129**, 1135.
11. Spink, W. W., Ferris, V., Vivino, J. J. *Proc. Soc. exp. Biol., N.Y.* 1945, **55**, 210.
12. Loewe, L. et al. *J. Amer. med. Ass.* 1946, **130**, 256.
13. Loewe, L., Rosenblatt, P., Lederer, M. *Amer. J. Path.* 1944, **20**, 89.

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the drug. Loewe[18] claims 7 cures with heparin as an adjuvant in cases which had failed to respond to penicillin alone, but the dosage of penicillin he adopted seems to have been well below that now recommended. There is no convincing evidence that better results are being obtained with penicillin plus heparin than with penicillin alone, and there are added risks with heparin.

With adequate dosage of penicillin the patient's sense of well-being improves soon after beginning treatment. The temperature may drop dramatically, or a flat curve be interrupted by spikes which may be due to emboli, phlebitis associated with intravenous therapy, or possibly pyrogens in the penicillin vehicle. Sometimes low fever persists, and occasionally there is no definite decline in the fever for several weeks. Blood-cultures are usually negative after a few days. Petechiæ may continue to appear for some time after this, and emboli may still be formed from detached pieces of vegetations. Obviously healing takes time, and it is these emboli which account for some of the deaths during treatment. Otherwise there is a gradual resolution of the symptoms and signs of the disease. Recovery may ensue even in apparently desperate cases. Even a previous hemiplegia following cerebral embolism is no contra-indication to treatment. Cardiac failure sometimes supervenes in patients who have been rendered bacteria-free. Irreversible damage may be present in the valves although penicillin has eradicated the infection. Absorption of vegetations and organisation with consequent increase of valvular deformity may result and lead to further impairment of cardiac function and ultimate congestive failure.

All the cases in the M.R.C. series received their penicillin by intermittent or continuous intramuscular drip. Most American workers seem to prefer continuous intravenous therapy in view of the consistently high blood-penicillin level which can be maintained. The disadvantages of intravenous therapy are the necessity for special and constant nursing care, the technical difficulties, with the need to employ a new vein every few days, the chance of phlebitis, the discomfort to the patient of an immobilised limb, and the risk of overburdening the circulation if congestive failure is present. There is no evidence that constant blood-levels are essential over the 24 hours, and Bloomfield and Halpern[10] have been successful with a scheme of treatment in which effective blood-levels were maintained for not more than a quarter of the time; injections given only four times a day arrested the infection in some cases. The patient will be pleased when a method of slow absorption is perfected and the number of injections thereby reduced. The relentless three-hourly injections day and night can be very trying even to the robust, even though the issue at stake is appreciated.

Penicillin is ready and willing but cannot seek its opportunity. It behoves all practitioners to make the diagnosis as early as may be and arrange for the patient to be admitted to one of the special centres or a hospital with facilities for penicillin treatment. The problem of early diagnosis will largely be solved if the possibility is kept in mind. Not only must bacterial endocarditis be considered in all cases of pyrexia of unknown origin, but it should be suspected whenever an obscure infection is found in someone known to have rheumatic valvular or congenital heart disease. It is a common experience in such cases to realise in retrospect that the true state of affairs might have been recognised much sooner. Prophylaxis must also be considered. Transitory bacteræmia may accompany even such minor surgical procedures as tonsillectomy or dental extractions, and in the patient with a damaged heart this may be the starting-point of a bacterial infection. Penicillin should be given to such people for at least a few days before and after these and similar procedures, and a careful watch kept thereafter. In this way lives can be saved.

MISS R. E. DARBYSHIRE

THE nursing profession has lost a remarkable woman in Miss Ruth Darbyshire, C.B.E., R.R.C., late matron-in-chief of the British Red Cross Society and Order of St. John of Jerusalem, who died on March 7. Earlier in her career she held the post of matron at St. Mary's Hospital and University College Hospital, London, of principal matron of the Territorial Army Nursing Service, and of chief superintendent of Lady Minto's Indian Nursing Association. She had a special link with this journal in that she was a member of THE LANCET Commission on Nursing, whose report appeared in 1932. At its meetings she showed a liberality and wisdom which are well remembered; and she had besides a happy steadying quality which must have endeared her to many committees. She contributed much to the conclusions of the commission; if the advice she and her colleagues gave had been translated into action fourteen years ago, we might not now be facing such a serious nursing crisis. Miss Darbyshire trained at Wakefield Street Hospital, Adelaide, and at St. Thomas's, London. She had to give up her work as matron-in-chief of the Red Cross in 1943, owing to ill health.

HEALTH CENTRES OF TODAY AND TOMORROW

THE idea of "health centres" has attracted a great many people both inside and outside the profession. Health centres of one kind or another are likely to be a prominent feature of any National Health Service sponsored by the present Government, and it may soon be necessary to consider what they should be like. On another page we publish the first two articles of a short series describing some of the health centres already existing in this country; and we hope to follow this with a further series on the Health Centres of Tomorrow.

ON Tuesday and Thursday, April 16 and 18, at 5 P.M. Dr. J. M. H. CAMPBELL will deliver the Lumleian lectures to the Royal College of Physicians of London. His subject is the Paroxysmal Tachycardias.

THE Royal Society of Medicine is holding a series of meetings on problems of protection and problems of efficiency which faced medical science during the war. Surgeon Rear-Admiral Sir Gordon Gordon-Taylor, president of the society, will open the proceedings at 5 P.M. on Monday, March 18, when Sir John Anderson, F.R.S., M.P., will be in the chair, and the meetings will continue daily at that hour till March 28. Further particulars will be found in our Medical Diary.

On Active Service

CASUALTIES

DIED

Squadron-Leader WILLIAM MCKEE BONNAR, M.D. Belf., R.A.F.V.R.

AWARDS

C.B.E.

Brigadier W. M. CAMERON, O.B.E., M.B. Glasg., R.A.M.C.

M.B.E.

Captain GRAHAM FORREST-HAY, M.R.C.S., R.A.M.C.

MENTIONED IN DESPATCHES

Major D. E. O'CONNOR CUFFEY, F.R.C.S.E., R.A.M.C.
Captain G. F. A. CALDWELL, M.B. Glasg., R.A.M.C.

MEMOIR

Squadron-Leader Bonnar, who was born in 1917, studied medicine at Queen's University, Belfast, and qualified M.B. in 1939. After holding a house appointment at the Royal Victoria Hospital, Belfast, he was in 1940 appointed demonstrator in physiology at Queen's University, where he remained till he was commissioned in the medical branch of the R.A.F. volunteer reserve at the end of 1941. The following year he was awarded the gold medal for his M.D. thesis. He died on Feb. 25 from injuries received in a flying accident while serving as medical officer at a Royal Air Force group headquarters in India.

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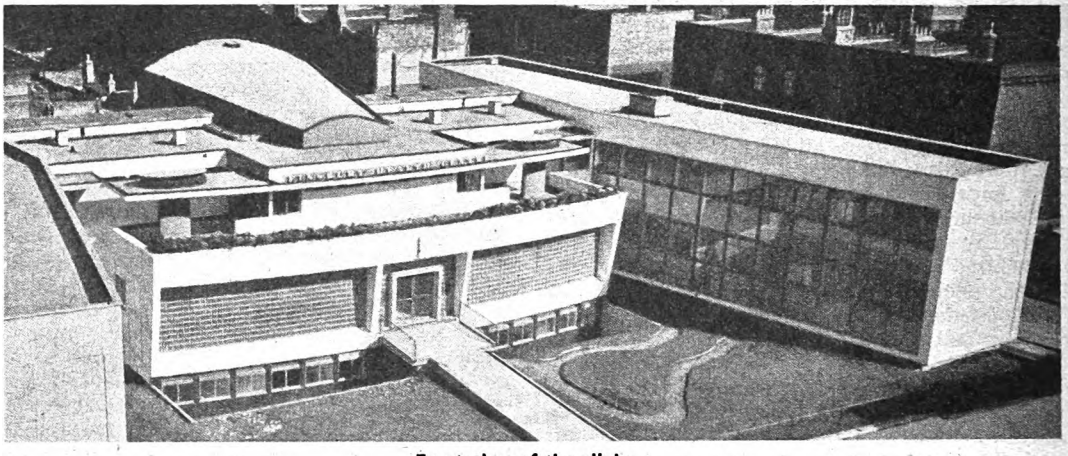


Front view of the clinic

Health Centres of Today

I. FINSBURY

A. B. STEWART
M.D. St. And., D.P.H.
ACTING M.O.H. FOR FINSBURY

THE term "health centre," used in the white-paper to describe new premises to be provided in the National Health Service, is necessarily vague. A great many different types of health centre need consideration. Hence the following brief account of the Finsbury centre and its work may be of general interest.

This centre, designed by Mr. B. Lubetkin, of Messrs. Tecton, for the borough of Finsbury, was opened in October, 1938. The project attracted considerable attention at that time in architectural and public-health circles. It has remained a constant source of interest to architects from many parts of the world; and its description in a "Penguin," *Introduction to Modern Architecture*,[1] has brought the building to the notice of a wide public. But it was not until the publication of the Beveridge report and the Government white-paper that interest in the functioning of the building was roused.

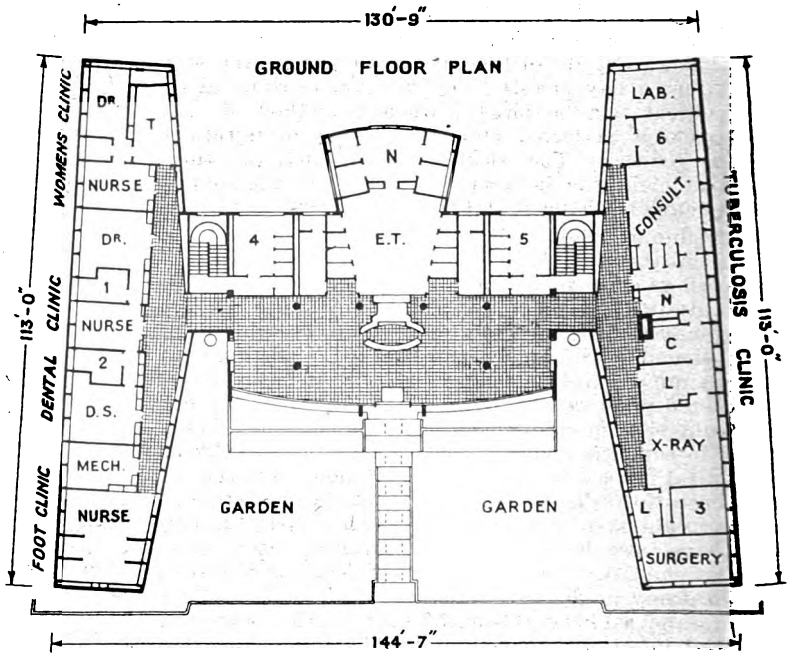
OBJECTS

The health services of metropolitan boroughs are administered partly by the borough council and partly by the London County Council. The borough council is therefore restricted in its activities, compared with the council of a county borough such as Bristol, which has a very comprehensive health service. Within its limits, however, Finsbury has made full use of its powers under the Public Health (London) Act, 1936. Situated in the East Central area of London, it is a congested industrial and residential district, the residents being preponderantly of the artisan and poorer class. Section 227 of the Public Health (London) Act empowers the borough council to provide suitable medical services for the poorer inhabitants, excluding residential treatment. In building a centre for this work, the council took the opportunity of providing new accommodation for the administrative, sanitary, and health-visiting staffs; and of rehousing the tuberculosis clinic, public-health laboratory, cleansing and disinfecting stations, reception house, and mortuary. The centre was built beside an existing maternity and child-welfare centre and a borough-council playground for children. In addition to the statutory provisions, a dental clinic, physiotherapy department, foot clinic, women's clinic for climacteric disorders, lecture-hall, and large entrance hall serving as a waiting-room were included.

It is generally agreed that the centre is a well-designed and attractive building; but in spite of what seemed bold planning in 1938, problems of space have already arisen. It is fortunate that the architects have so designed the building that expansion can be carried out readily.

USE OF THE CENTRE

The success of the centre was never in doubt, but that it should have become so popular despite war conditions, including a drop in population from 69,000 to 30,000 or less, and intensive air attack, is remarkable.



1. Male recovery. 2. Female recovery. 3. Dark-room. 4. Female staff. 5. Male staff. 6. Staff office. C. Clerk. Consult. Consulting-room. D.S. Dental surgery. Dr. Doctor. E.T. Electrical treatment. L. Lobby. Lab. Laboratory. Mech. Mechanic. N. Nurse. T. Treatment

1. Richards, J. M. An Introduction to Modern Architecture, London, 1940.

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A few examples will show the rapid expansion which has taken place while the population has been halved.

In the *solarium* and *physiotherapy* department, a part-time masseuse did all the work in 1939. In 1946 two full-time and one part-time masseuses, with an attendant, each give 26 sessions a week. These include ultra-violet and infra-red therapy, massage and remedial exercises, and electrotherapy. All patients are referred to this department by doctor's letter, and treatments are arranged by appointment. The number of treatments given annually from 1939 to 1945 were 6910, 8101, 7267, 13,154, 14,567, 10,032, and 9122. The reduction in 1944 is accounted for by the flying-bomb attacks.

A fully equipped *dental surgery* is provided. In 1938 few dentists practised in the area, and some had additional professional duties elsewhere. Many inhabitants were unable or unwilling to pay for dental treatment. Even now, after six years, there is less conservative work than might be wished. The dental staff receives every facility, including nursing and clerical assistance. A panel of local doctors act as anæsthetists, and hold ten sessions weekly. Patients are seen by appointment. The number of attendances at the clinic annually from 1939 to 1945 were 2139, 2833, 2943, 3858, 4291, 4413, and 5020.

The *foot clinic* was opened with a staff of one part-time chiropodist engaged for two sessions weekly. The staff is now three full-time and two part-time chiropodists, holding 36 sessions a week. Clerical assistance is provided, and patients are seen by appointment. Before 1939 there was no chiropodist in the borough in either public or private practice; and, although some of those needing treatment had it elsewhere, the majority had none. The number of attendances at the clinic annually from 1939 to 1945 were 2241, 2629, 2343, 4600, 6818, 8037, and 10,244.

The *women's clinic* is held once a week by a gynæcologist. Special attention has been paid to climacteric disorders; minor gynæcological conditions are treated and postnatal examinations and exercises given. Two nurses attend this clinic and the patients are seen by appointment. The number of attendances annually from 1939 to 1945 were 638, 506, 303, 502, 372, 371, and 395.

The *other services* in the building are those of the normal statutory work of the borough council.

The clinical services are provided on payment of a small fee: in the physiotherapy department patients pay 1*s.* 6*d.* per attendance, and in the women's clinic 1*s.* 6*d.*; in the foot clinic the charge is 2*s.* per attendance, while in the dental clinic the charges are at approximately National Health Insurance rates. In all cases referred under the tuberculosis and maternity and child-welfare schemes, payment is made by internal adjustment of accounts, and costs the patient nothing. Old-age pensioners receiving the supplementary allowance are treated free, and a suitable assessment is made where patients say that they are unable to pay the fee.

ATTITUDE OF THE PUBLIC

These figures, covering years when conditions were adverse, should remove doubts of the patient's willingness to visit health centres. The habit of visiting doctors at institutions is well established in this country, the last available figures showing that 5½ million outpatients were treated at voluntary hospitals in 1935. Apart from the treatment, factors which appear to attract patients to the centre are the appointment system, the privacy possible in a well-designed building, and the smallness of the fee for non-statutory services. The appointment system enables the staff to avoid a sense of hurry and to establish a proper relationship with the patient. The provision of nursing and clerical staffs allows the professional staff freedom from minor administrative detail during sessions. Grouping of various services in one building gives them good opportunities for consultation and discussion. If, in future, a medical gregariousness of this character can be attained, the general practitioner can lose his present partial isolation and in some measure recapture the atmosphere of his hospital days.

The laboratory in the centre provides side-room facilities for all practitioners in the borough, as well as a public-health bacteriological service, but the full development of this work has been hampered by war-time conditions.

The figures given here show that the Finsbury health centre has fulfilled its purpose. Experience with the present services and population suggests that Stark Murray's proposal[2] of one health centre for 20,000 people is probably a useful working basis in an urban area with good transport facilities. Both Hamilton Hogben[3] and Talbot Rogers[4] have emphasised the importance of health centres being new. Attractive buildings which are properly designed and equipped are not only agreeable to work in but an encouragement to prospective users. It is to be hoped that in the development of centres, enough provision will be made for medical auxiliaries: physiotherapists and chiropodists have rendered good service in Finsbury, and other types of auxiliaries could be usefully employed.

II. PECKHAM

THE FIRST HEALTH CENTRE

G. SCOTT WILLIAMSON
M.C., M.D. Edin.

SOME twenty years ago we set out on our first tentative inquiry into the nature of health, and established a first health centre. At that time we thought of registering the name but found that a nature-food store had forestalled us. We therefore called ours the Pioneer Health Centre. It is still, I believe, the only health centre in a proper sense of the term.

The Peckham experiment represents a development and evolution of the science of hygiene. Hygiene began as public hygiene. From the health of the people en masse it should proceed to deal with the health of the people in person—i.e., with personal health. The person is a "member" or "limb" of a body, the family; so personal health or wholeness can only be dealt with through family health.

PATHOLOGY AND ETHOLOGY

The Peckham experiment was then, from the beginning, essentially a family health centre. It was more: an unusual mixture of family club and biologist's laboratory, dealing with the leisure life of the family and its personnel. This particular set-up cannot be appreciated unless we understand the biological distinction between health practice and medical practice. The Peckham health technique is fundamentally different from any form of medical technique.

Health technique as applied to the family and its personnel is directed to determining how healthy they are, by looking for and assessing what is *right with them*—physically, mentally, and socially. By contrast, the medical technique and services are determining how disordered and/or diseased the person is, by looking for and assessing *what is wrong* (physically and mentally, and now, belatedly, socially).

The medical approach is essentially one derived from the study of pathology. The Peckham approach—the determination of what is right with the family and its personnel and home—is derived from the other branch of biology not previously differentiated, and for which

2. Murray, D. S. Health for All, London, 1942; The Future of Medicine, London, 1943.
3. Hogben, G. H. *Med. Offr*, 1945, 73, 13.
4. Rogers, A. T. *Lancet*, 1945, ii, 511.

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hitherto there has been neither name nor technical procedure. Let us call this branch of biology—ethology.

These two approaches, the pathological and the ethological, are parallel; they never meet. The only bridge that leads from one to the other is convalescence, or, as it is now fashionably called, rehabilitation. Nor should we confuse the issue by speaking of "positive" health, implying that there is a "negative" health; for you cannot estimate the absence of health by the positiveness of disorder and disease. Health is positive in any case: disorder and disease are equally and disastrously positive. The fact is that the two approaches are fundamentally different in principle. Furthermore, they are just as far apart in practice and detail or technology.

Medical practice determines "what is wrong," studies the pathological situation, and can only proceed to correct or prevent the wrong by remedial treatment—the medical, surgical, and psychological procedure of therapeutics. Nor need we be confused by the slogan that "prevention is better than cure," for preventive remedies which are directed against disorder and disease are defensive and offensive remedies for an anticipated wrong. So even preventive medicine is a pathological procedure; it is informed by the science of pathology. That is why any preventive measure in the wrong hands can become a very dangerous drug—vide contraceptives in their ultimate effect. So prevention is merely a method of correcting what may become wrong.

By contrast, the technology of personal hygiene has nothing to do with either correction or prevention. Having determined what is right, you must then proceed to cultivate and educate or grow the right by ecological methods. Just as therapy is the technological aspect of the science of pathology, so is ecology the technological aspect of the science of ethology.

Hitherto what is right—health or wholeness—has been assumed to be able to look after itself. In fact even the proposed new medical services assume that all those who can look after themselves, by whatever means, are ipso facto the healthy and vital—a most disastrous error.

The family consultation

We have not only adopted, but deliberately enforced, a laissez-faire attitude to personal health, so that any individual concerned for his own health is dubbed a neurotic or psychotic. It is in fact strange that, until the Peckham experiment was started twenty years ago, nobody ever took the slightest trouble to find out, by systematic examination, who in a community was healthy, or even who in a community was *not* diseased.

The systematic study of *pathos* of the people, or pathology, has proved its worth; but the best that can be made of a bad job with it is to stop the bad from getting worse.

In the Peckham Health Centre we have begun a systematic study of the *ethos* of the people, and have made a first tentative technological approach to their ecology. Health, we have discovered, is like a seed: it must be sown, grown, and cultivated in the seed-bed, garden, or tilled field—the homestead—of the social soil. It is clear, therefore, that any centre dealing with the pathology of a patient, whether by prevention or correction, can have not the slightest resemblance in practice to a *health* centre dealing with the ethology and ecology of the family, with its personnel and its home.

The social floor

THE PECKHAM CENTRE

A Peckham type of health centre has to cater for the leisure of all the personnel of 2000 families, which must represent all age levels and all wage levels.[1] This ensures that it is a diversified and mixed community, which embraces "all sorts and conditions of men," representing a vertical sample of society. The 2000 families must live within the circumference of the radius that a "child of five years" can traverse, so the centre must be strictly local. The unit of membership is "the family," by which we imply the mated pair, either with or without children; the reason for this is that the smallest biological whole is the family nucleus, with its individuals—like its genes—set in its "cell," the *home*.

The families pay a weekly family subscription to maintain their centre as a voluntary organisation. All the

1. Pearse, I. H., Crocker, L. H. The Peckham Experiment. London: Allen & Unwin. 1943. 5s.

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members, who are the limbs and trunk of a body—the family—must submit to physiological and biological overhaul periodically and as other needs arise, at both the family's own request and the request of the staff.

These are the only rules:—

1. Only families can join.
2. They must reside in the district.
3. They must pay their weekly dues.
4. They must submit to the periodical health overhaul.

No family or member of a family is excluded if they conform to these rules of admission. There are no other rules or regulations of any other sort; there is nothing to tell the members what to do, when to do it, or how to do it; nor to tell them what not to do, when not to do it, or how not to do it.

The only authority exercised by the staff is authority to prevent any other group or person assuming authority. Within the centre the members can do what they like, when they like, where they like, and how they like; they enjoy the free exercise of their æsthetic as well as their physical and mental faculties.

The Building.—The centre is furnished with the apparatus needed by the members to exercise their faculties and capabilities. For example, on the wide open social floors there is a cafeteria restaurant, a gymnasium, swimming-baths (one competition size and one shallow for the children), a theatre and concert-hall. Each of these is equipped with its special apparatus, and any partitioning of space is temporary and for the purpose of the moment only. All halls or spaces that need walls, such as the theatre and swimming-bath, have glass walls, for nothing should be hidden away or secreted. The principle followed is that of the open forum; the only exception to this principle, which allows of free circulation throughout, is the few rooms needed for physical examination in the nude; even the laboratory opens, as it were, on to the highway.

The centre should stand in open ground, with not less than three acres of practice grounds. It is quite unnecessary that it should cater for clubs, such as tennis, football, &c., for these are group activities involving larger communities than 2000 families.

The Dietetic Farm.—Every Peckham type of centre has to have its dietetic farm, of about 100–150 acres, to provide special diet for the pregnant mother and weaning child.

Staffing.—The staff of biologists should have medical training and experience, and be well versed in dealing with people. This will be necessary until the centre can train its own staff in Peckham technique, as an alternative to clinical training; but that is not yet. Future training will be in social biology instead of clinical medicine. At present the staff have necessarily to be trained in this technique after joining the staff.

The original centre was run with a staff of four doctors (two male and two female) doing the direct examinations; a laboratory staff of two technicians doing the chemistry; and two nurse-receptionists who booked appointments. All members were seen by appointment to suit themselves, the staff working from 2 to 10 P.M. five days a week, from Tuesday to Saturday inclusive. The other scientist member of the staff was a social biologist directing the examination of the social behaviour of the families; but all the biologists (doctors) spent at least a quarter of their time on this work. It took one year's observation to get a picture of the social behaviour of the members of a family, from which it was then possible to build up a picture of the social *action-pattern* or "socionomy" of a family and its personnel. This entailed observing who they associated with, what activities they chose, and above all *how* they did what they elected to do. This is a far more revealing technique for a survey of character, personality, and individuality than any psycho-analytical procedure. Only at the second periodic overhaul can these observations be incorporated in the information and knowledge placed at the family's disposal at the family consultation.

It is thus obvious that all the furnishings of the centre were, in fact, scientific instruments for the estimation and survey, as well as essential equipment for the cultivation of the faculties and health of the members. In no sense were these things mere amusements or time-killers. Spectatorship was conspicuously absent from the social life in the health centre, for after a few months of membership everybody was himself doing something.

Domestic Staff and Service.—Except for the specialised engineering maintenance, no servants were provided. All the work of the centre was planned to be on a self-service basis; for example, all teaching and instruction in the use of equipment was done by the members themselves; there was no paid teacher or instructor in gymnastics or in the other skills. Members all learned from each other, even down to the youngest child swimmer—at 4 years of age. This absence of formal instruction and professional instructors made it possible for all, no matter how lacking in confidence or how unskilled, to try to do things that they had never dreamed of doing. Thus the urge to facultation, stimulated by the free opportunity for action, and the sight of others less competent than they, led to spontaneous and autonomic development and growth. Tilling the social soil led to the natural development of the contents of the seed.

That is the aim and the object of a health centre: it is an organic, cultural, and educational organisation for the development of the human faculties. In no sense then can it be compared with a therapeutic and diagnostic institution for dealing with disorder and disease.

Towards Social Security

A Flair for Administration

THE plan for national benefits, grants, and pensions, now before the House of Commons (and doubtless the plan for medical services soon to be announced) calls for still further improvement in the developing art of the administrator. Following an infantile analogy someone has said that "the machinery of administration should be seen but not heard." How often the professionally qualified enthusiast—be he doctor or scientist or engineer—has girded against the barriers set up against him by "administrative considerations."

The problem has of course long been with us in the hospital field, but it will assume wider significance if the general-practitioner service becomes more highly organised.

It is interesting to note the experience of the British Broadcasting Corporation in treating "administration" as a subject for separate attention. For many years the officers immediately subordinate to the director-general and his deputy were controllers in charge of programmes, engineering, and administration. Drastic reorganisation during the war created a larger number of controllerships and disbanded the old division of "administration," distributing it among the specialist divisions. Sir William Haley, the present director-general, speaking to the Institute of Public Administration last month, said he did not expect a revival of the old separation: in other words, the present controllers will continue to have full responsibility not only for the functional or technical work allotted to them but also for all the administrative and even financial aspects of that work, each of them being directly responsible to the director-general in a comprehensive manner. The B.B.C. experience may form a useful pointer for other big undertakings.

This argument does not belittle the distinctive contribution that can be made to all phases of human endeavour by the person who, for want of a better description, is often called a layman. In the workings especially of a great democracy there are strong grounds for the tradition that responsibility at the highest level should be discharged by those whose training and experience are of the

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widest possible kind. But this does not necessarily exclude professionally qualified persons, as has been made evident at the Ministry of Health in the last decade by the appointment as secretary of one who was formerly the department's legal adviser. Clearly, a professional qualification is not in itself a disqualification for the high offices, and this point may have even greater practical importance when appointments are made to local supervisory posts.

Hitherto a legal qualification—usually that of barrister—has often been taken as an extra part of the training for a purely administrative service. The preparation is of course less arduous, less lengthy, and less expensive than that for the medical profession; but it would be an interesting development if a senior position concerned with the supervision of, say, sickness benefit were occupied by an administrator who, among other qualifications, had received full medical training. Difficult as it might be to spare such a man from the field of pure medicine, there is no doubt that the additional knowledge and judgment he might bring to such a task might so enure to the advantage of patients and doctors alike that the "waste" of his medical skill would be wholly justified.

Insurance of the M.O.H.

The National Insurance Bill groups the community, after leaving school and before retiring, into employed, self-employed, and non-employed. An interesting illustration arises in connexion with medical officers of health. Those who are working whole time for a local authority will be classed as "employed," but those who act in a part-time capacity while engaging in local practice "as it is at the moment, and not as it will be, perhaps, in the future" (to quote Mr. Lindgren on Feb. 26) will be self-employed, that being the appropriate class of the main occupation.

Admittedly a full-time M.O.H. is not employed "under a contract of service" but rather under a contract *for* service. But as in the case of town clerks and other persons who are statutory officers and whose activities the council cannot control in detail, the Minister intends to make regulations for bringing them in. JUSTINIAN.

Public Health

Lancashire Achievement

Dr. G. Lissant Cox, who retired two months ago "after a long and lucky innings of 33 years with the Lancashire County Council," can now enjoy the pleasure of looking back on a big job well done. We recently commented on the Middlesex scheme[1] of tuberculosis areas, each having about 50 beds, with X-ray plants, dispensaries, and a team composed of a tuberculosis officer and assistants. This pattern was adopted by Lancashire, under Lissant Cox's guidance, some 25 years ago, and has had results which are reflected in figures. In his final report[2] he notes that whereas in 1913 no less than 112 people per 100,000 in Lancashire died of tuberculosis, in 1944—despite two major wars, the Geddes axe, and the slump—the number had fallen to 51.

The scheme is more comprehensive, and the number of beds in use greater, than ever before. Work begun in the last few years includes mass radiography, administration of maintenance allowances to the value of £50,000 yearly, a rise of 70% in new cases examined as compared with the number seen 10 years ago, examination of sanatorium and war-time nursery staffs, and reablement measures; and this despite the fact that all sections of staff have been depleted.

The administrative county is divided into five large areas (with average populations of 319,000) and three small ones. Each large area is in charge of a team composed of a consulting tuberculosis officer, one or more assistant tuberculosis officers, 4–7 health visitors, and one or two clerks; and each area has a chief dispensary, two or more branch dispensaries, and a sanatorium-hospital containing up to 70 beds for the treatment of patients near their homes. Since the consultant tuberculosis officers are the visiting medical superintendents of the sanatorium-hospitals, they have institutional beds, like other consultants. Of the 25 dispensaries in the county, 13 possess X-ray equipment. Though Lancashire, with other parts of the country, has seen a rise in incidence of pulmonary tuberculosis over the 1938 figures, this has been relatively small, at 12–15%. There has been no similar rise in the incidence of non-pulmonary tuberculosis, the figure for 1944 being the lowest yet recorded. Deaths from pulmonary tuberculosis, which rose in 1940 and 1941, have since declined, and the 1943 rate was the lowest so far. New cases examined at the dispensaries have risen from 4418 in 1934 to 7426 in 1944, and X-ray examinations made through the dispensary service have more than doubled in the same time, the 1944 figure reaching 24,441. Pneumothorax refills, which are a measure of the growing importance of surgery in pulmonary tuberculosis, have increased from 2012 in 1934 to 6717 in 1944.

Lancashire provides at present 1 bed per 2235 of the population, or 106 beds for every 100 deaths from pulmonary tuberculosis. For non-pulmonary cases 1 bed is provided for every 7410 of the population, or 136 beds for every 100 deaths.

The report also contains an account by Dr. F. C. S. Bradbury of his work on the typing of tubercle bacilli, with a note on the case of avian tuberculosis which he reported in our columns on Jan. 19.

As Dr. Lissant Cox's successor Dr. Bradbury inherits both achievement and opportunity.

Smallpox

The Ministry of Health points out that Service men and women in large numbers are returning to this country by aeroplane and ship from places where variola major is endemic, and they or their kit may be infected. Many of them are so well vaccinated that if they develop the disease their constitutional symptoms may be so slight and the rash so modified and sparse as not to inconvenience them (the same is, of course, true of well-vaccinated persons who have not been out of the country). When people with modified attacks seek medical advice, it is possible that a diagnosis of variola major may not be made since practically all the classical symptoms and signs of this disease are absent. Two such cases in Hampstead metropolitan borough and Thurrock urban district have given rise to localised outbreaks, and in both the diagnosis was only made possible by subsequent events. Up to March 12 there have been 11 cases (2 fatal); 10 of these were probably direct contacts, and 1 (fatal) was infected by clothing. Both the fatal cases were hæmorrhagic. In the circumstances, it is important that all practitioners and hospital medical officers should bear smallpox in mind, and the Ministry reminds them that doubtful cases should be reported to the medical officer of health, who will, if necessary, arrange for the gratuitous services of a consultant.

Altogether 9 cases have now arisen from the R.A.M.C. orderly who brought the infection in from a ship to Grays, Essex. Since last week (p. 361) a boy aged 9, son of a fatal case, has developed smallpox, and so has the wife of the other fatal case; the wife had been removed to hospital for observation, and developed the disease there.

1. *Lancet*, Jan. 19, p. 106.
2. Prevention and Treatment of Tuberculosis in the Administrative County of Lancashire. Report of the Central Tuberculosis Officers of the Lancashire County Council for the year 1944. Pp. 20.

NORTHERN IRELAND REGIONAL HOSPITAL COUNCIL.—The council recently met to consider reports from a coördination committee and 14 subcommittees set up to examine the proposals of the hospitals surveying officers which were reviewed in THE LANCET of Oct. 20, p. 505. These reports recommend, among other things, a central hospitals authority, a key hospital for the region based upon the Queen's University Medical School, a number of area hospitals, and the coördination of all hospitals. Mr. D. Lindsay Keir, LL.D., vice-chancellor of Queen's University, is chairman of the council, which was formed under the auspices of the Nuffield Provincial Hospitals Trust. The meeting was attended by Sir Ernest Rock Carling (chairman of the medical advisory committee of the trust), Sir George Martin (chairman of the Yorkshire regional council), Mr. L. Farrer-Brown (secretary of the trust), and Mr. C. M. Abbott (assistant secretary). The visitors were entertained to lunch by Mr. John Grant, minister of health and local government, and were present at a dinner given by the council, at which the principal guest was Sir Basil Brooke, the prime minister.

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Parliament

ON THE FLOOR OF THE HOUSE

THE debate on defence this week escaped immediate tempest, though experienced pilots prophesied weather dangers ahead. But the debate on housing ran into a storm of criticism. However, Captain Aneurin Bevan boldly challenged the elements in opposition, and thanks to his mastery of seamanship succeeded in manœuvring his craft safely through its second reading.

The request made in the debate for powers to further housing in town and country had an interesting background in the battle going on in committee upstairs on a Bill to make possible the acquisition of land needed for housing. And Captain Bevan on his quarterdeck made it clear that the rural houses demanded by the Opposition would not be built without the land about the acquisition of which they were making difficulties. The Opposition, stung to fury, and with some of its front-bench members white with high feeling, one after another rose to points of order, which were not points of order but points of protest. And Captain Aneurin Bevan leaned over from his despatch-box urbanely and, with a complete mastery of the detail of his subject, flayed the Opposition to the rousing cheers of the packed Labour benches and smiles from the Prime Minister.

Social legislation will certainly go through, but the danger to the Government comes from its foreign and defence policies. In the minds of members on both sides of the House there is a doubt as to their complete integration.

MEDICUS, M.P.

FROM THE PRESS GALLERY

The Menace of Famine

In opening a debate in the House of Lords on March 7 on the foreign situation, Viscount SAMUEL said that famine was at hand in India, and shortages were acute in many countries in Europe. Drastic cuts had been announced in the supplies to Germany in the British zone, and he felt concerned at the spirit which had been shown in certain quarters in this country, and even occasionally by His Majesty's Government. The only interest in the subject seemed to be to make sure that the Germans were not so starved that they died or became centres of infectious disease, or broke out into riots and violence. That seemed to him the wrong attitude. We had a duty in Germany apart from our own interest. He did not claim precedence for the Germans over the Indians, but he thought criticism was merited by an utterance of the Minister of Food which seemed to have given the impression that he would rather see famine in Germany than some minor discomfort in Great Britain.

Viscount STANSGATE regretted that the Security Council of UNO had not given more attention to the immediate and urgent problems of the world, such as hunger. There was a grave shortage not only this year, but, unless the weather changed or great new areas were sown, for at least two years to come. But the Assembly was not altogether helpless. A debate on UNRRA had secured some £20 million to its funds and a general debate on famine had led the great growers of food—Canada, Australia, and the United States—to make generous offers of help. In addition, the Social and Economic Council had been set up.

The Bishop of CHICHESTER had been surprised by the suddenness of the cut last month in bread and cereals reducing the average diet in the British zone in Germany from 1500 to 1000 calories. Compared with the average British consumer's allowance of 2800 calories, 1000 calories was near starvation. It was said that the deficit was so grave that unless large new supplies were brought in the rations would fall to 700 calories by the end of April, and some had mentioned an even lower figure and an earlier date. He reminded their Lordships that the rations in Belsen started at 1200 calories and never fell below 800. With 21 million in the British zone starving, and millions likely to die, with industry dead or decaying, British prestige was bound to suffer a deadly blow, and the whole Western democratic idea would be fatally compromised. The problem of hunger was a world problem and should be put on a world basis. Meanwhile something might well be expected from ourselves in the United Kingdom. Despite the strain of the war years the nation's health was good, and he believed that if the British people were informed of all the facts they would be ready to stand controls and sacrifices a little longer.

The LORD CHANCELLOR agreed that it was a tragedy that the German rations had had to be cut. Undernourishment in Germany was likely to lead to disease, rioting, and unhappiness. Apart from religious dictates, common sense made it essential to do what we could to keep Germany from privation, for a disease black spot in the centre of Europe was an obvious danger. But the Bishop of Chichester must face the fact that there was not the food. We had provided out of our slender dollar resources large sums to feed the Germans. If the food were there we would pledge ourselves even further, but it was not. Today the Minister of Food was the trustee for the people of this country, and he had to be sure that they were not going to be faced with famine. The Minister had no right to gamble, for whatever high motive, with the food of the people of this country.

New Housing Subsidies

In moving the second reading of the Housing (Financial and Miscellaneous Provisions) Bill in the House of Commons on March 6, Mr. C. W. KEY, parliamentary secretary to the Ministry of Health, said that the three factors determining the amount of financial assistance to be given to housing authorities were: the improvement of standards; the fixing of rents which tenants could afford; and the heavy cost of building, which must not be allowed to prevent houses being built now while costs were being brought down. The standard taken was a three-bedroom house, with modern equipment in bathroom, closet, and kitchen, and with an overall living area of 900 sq. ft., plus 50 sq. ft. for outhouses, which compared with 750 sq. ft. in the Act of 1938. For the standard flat, the overall area was 800 sq. ft. For the standard house the assumed average net rent was 10*s.* a week in urban areas and 7*s.* 6*d.* in agricultural areas. For flats it was 12*s.* The Government estimated the annual deficit on a standard house—on a 60-year basis—to be £22. This would be divided between national and local funds on the basis of 3 to 1; that was, £16 10*s.* from national funds and £5 10*s.* from the rates. This compared with the existing subsidy of £5 10*s.* from national funds and £2 15*s.* from the rates. Provision was also made to deal with the exceptional needs of the following: agricultural areas, areas where the rent-paying capacity of the tenants was abnormally low, areas where because of high site costs it was necessary to erect flats, areas in which extra expenditure was required because of mining subsidence, areas where, because of low rateable value, high rate expenditure, and serious housing problems, the cost of housing was particularly burdensome; and lastly, the building of houses by non-traditional methods. Mr. Key denied that private industry and enterprise were inhibited from taking a full part in the building programme. But it was definitely the policy of the Government that the main emphasis should be upon houses which could be let at reasonable rents to those who were in greatest need of shelter, and they held that the only effective way of securing that the great bulk of new houses built were for letting was to concentrate on their provision through the local authorities.

Antiseptics for Use Underground

Colonel M. STODDART-SCOTT asked the Minister of Fuel and Power if he was aware that under section 85 of the Coal Mines Act, 1911, 2% alcoholic solution of iodine, or other antiseptics approved by the Board of Trade, must be available for first-aid underground; and, as other and more modern antiseptics than iodine were available on the surface, what modern and more efficacious antiseptics had the Board of Trade approved for use underground.—Mr. E. SHINWELL replied: No alternative antiseptic to iodine has yet been approved for use underground. Practical trials are, however, being made underground to determine the effectiveness and general suitability under those conditions of other forms of antiseptic, and the position will be reviewed when results of the trials are known.

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In England Now

A Running Commentary by Peripatetic Correspondents

THE other day, on a busy Monday afternoon, a man of 37 came to see me complaining of two small tumours on his scalp. I diagnosed them as sebaceous cysts and told him that he should have them removed. He agreed, and I wrote a note for him to take to St. Crispin's Hospital. I said, "If you attend tomorrow at 9 o'clock in the morning they will be removed." He replied: "I couldn't do that because I am not on duty and I would like to go in the afternoon when I am on duty." I said, "Well, in that case I am afraid you will have to go to another hospital where these things are done in the afternoon." He agreed, and I wrote a new note and gave it to him.

I thought he would now go. But he looked at me very steadily and said, "As I am here would you mind looking at my ears, please. I have usually wax gathering in them and would like a doctor to have a look at it." I looked and found a little wax and gave him a prescription for some ear drops to soften it.

He did not take his leave. He said, "I have had a little cough recently. Could you do something for it?" I thought, "I have to control myself," and asked him about the nature of his cough and examined his chest (Yes! I still do such things) and gave him advice and a prescription.

My finger was on the buzzer for the next patient when he said, "Incidentally, I have a pain in the neck." For a moment I did not know if I should cry or laugh, but the "pain in the neck" had its effect and I could hardly suppress a grin. "Yes," he continued, "I have had it for seven years. When I was in Palestine the M.O. had an X-ray taken and a blood test made, but I was posted to another station before I found out what the results were. Would you like to have a look at my neck?" I said, "Well now, perhaps you would like to come in a few days' time and we shall go into it very carefully; but please not on a busy Monday or Saturday." I pressed the buzzer. The next patient put his nose in but withdrew when he saw that his predecessor did not make any attempt to move. He said, "Oh! Yes! And I saw a specialist, too, about it and *he* did not know what it was. What is your opinion?" I said, "I think if you come in a few days, as I said before, we shall have more time to discuss it in detail, but now I really have to carry on."

He looked at me steadily. Then he said in a slow manner, "Oh! As I am here I was wondering. The wife does not look very fit recently and I can't make her go and see a doctor. Could you perhaps do something about it?" I can report, with due admiration for myself, that I still kept myself under control when I said to him, "I think this is another thing we might discuss some other time. Incidentally, the wife surely has her own doctor?"

I pressed the buzzer energetically and asked the next patient who looked in hesitatingly to come in and sit down. With surprise, and slowly, my man withdrew.

Now it so happens that the Government pays me for seeing these people. I wonder, is this an omen for the new State medical service?

* * *

It is gradually dawning on me how tolerant of our madnesses are the mass of hospital patients. It is only the occasional rebel who tries to point them out—and then we treat his constructive criticism as ignorance and ingratitude. There was one such last week. He talked for fifteen minutes of the pains in his stomach. I listened politely and then began my usual more or less complete examination by looking at his fundi. There was thus a very short bee-line from his mouth to my ear for the abusive commentary on this manœuvre. I gathered that I had not been listening for the past fifteen minutes and if I had then I might at least have believed him and even if I had believed him then I ought to know better than to try to see his stomach through his eyes. I was so rash and illogical as to insist that when I was looking at his eyes I wasn't really looking at his eyes but at his cardiovascular system and his central nervous system. This, in his opinion, was another blatant lie and even if it had been true it was still miles from his stomach. I was by this time completely unnerved and flew to the other extreme where I tried his plantar responses. This was too much. The patient discharged himself that evening.

Perhaps it was my fault. I can never feel my examination is complete unless I visualise the body zebrified into a series of horizontal dermatomes which I scour in turn from above downwards for palpable pulses, percussable tendons, and illuminable orifices. If I take one segment out of sequence, then those skipped never appear in my case-notes. If I pass from fumbling for the thyroid to scratching the abdomen with pins, then the patient's chest is not even glorified with "N.A.D."—it does not even exist. If the patient's complaint is of gangrene of the toes, he needs must lie for ten minutes while I plod down through the bands of a garment, invisible to all but me, which resembles long combs in extent and a football jersey (Glasgow Celtic) in pattern. Fortunately such men are old and therefore patient. It is the young man with Buerger's disease who makes the most fuss. The only patients who can regard me as in any way compos mentis are those who complain of pediculosis capitis or vertical headaches.

I do not recommend the method. I would abandon it if I could. I mention it as a warning to those with imagination. The only real satisfaction is in applying the stripes to one's superiors in moments of boredom, humiliation, or frustration. This requires intense concentration and produces a sense of unstriated smugness, a combination which they invariably construe as intelligent respect.

* * *

In all fairness to future War Historians I feel I should place on record that thrice during the past six months I have contemplated putting in an application for a majority. On the first occasion I had laboriously collected and recollected all the relevant data and had distorted it into a real Tear-jerker, when I discovered from the *News of the World* that Venus was in the Ascendant in the House of Mars. Now my deaf uncle, who is also an exceptionally deaf Brigadier, has repeatedly drummed into me that the War Office is not quite itself at these times: it is liable to get into a rut from which there is no dislodging it; it has even been known (once or twice) to deny that the customer is always right. So I put my application back in the frigidaire, and started to make a wool rug instead. Some weeks later, while trying to locate a spare pair of laces, I came across it again. I refurbished it, brought it up to date, and was just about to despatch it via the usual sewers when I discovered from the *Daily Mirror* that Jane was in the Altogether. I cabled my uncle (reply paid) and he said he thought it would be risky. Wiser not, were his words. So that was that. You must admit that so far I had been dogged by sheer bad luck. And it wasn't for want of trying, either.

Then I suddenly discovered that some ass had speeded up demobilisation. Specialists (and even Graded Ones like me) of my A. and S. Group hand back the King's shilling, tin hat, respirator, whatnot in March instead of May. This meant a considerable readjustment of my plans, which is just what I'm not very good at. There wasn't a moment to lose. This time I contemplated suggesting, if it wasn't a rude answer, that I stayed on a bit longer and wore a crown. I would point out that for some years now I had been winning the war at a financial loss and would like to recoup. Besides which I wanted to be able to tell people I'd been a Major instead of having to have it dragged out of me that I had only been a Captain, even though I might add defiantly that I had also been a Graded Specialist in "Hunt the Ticket and Allied High-Minded States of No-enthusiasm." I would add too that doubtless there were other excellent reasons for my promotion, which, although they escaped my dim intelligence for the moment, the War Office would instantly recognise.

Eventually I risked the rude answer and suggested that I should receive a crown (no postage stamps accepted in lieu) and should render an extra fortnight's service. I got the rude answer.

In future I shan't bother with astrology. I shall just do what the voices tell me. It will come to the same thing in the end, I expect.

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Letters to the Editor

BIOLOGICAL DANGERS FROM ATOMIC FISSION

SIR,—My attention has been drawn to letters from Dr. B. P. Wiesner and Mr. Kenneth Walker which appeared under the above heading in THE LANCET of Jan. 5 and 12. The issues raised are undoubtedly important; but, having knowledge of what has been done to deal with them, I can say with assurance that all the dangers mentioned in the two letters have received full consideration by those in charge of the Canadian and British Atomic Energy Projects, in connexion with which an elaborate health organisation has been built up. The regulations enforced in Canada were framed on an exceedingly stringent basis and arrangements are being made to ensure the adoption of similar standards in this country. The existing regulations dealing with radiation hazards are undergoing thorough revision in the light of the information gained and with a view to the new situation.

As to the possibility of genetic effects, authoritative genetic opinion is being kept in touch with the nature of the risks to which workers concerned with an atomic-energy installation might be exposed, and will require to be satisfied that these are reduced to a level which is not significant, in comparison with those arising from other long-recognised causes.

With regard to the disclosure of new information, steps are being taken to secure, as soon as possible, the release of reports which have been prepared by the health division of the joint British-Canadian Project, but have hitherto been covered by security restrictions. Meanwhile, a study of the extensive literature already available would make possible a more correct assessment of the dangers involved than that which the letters of Dr. Wiesner and Mr. Walker might be taken to suggest.

H. H. DALE
Member of the Advisory Committee to the Prime Minister on Atomic Energy: Chairman of the Medical Research Council's Committee on the Medical and Biological Applications of Nuclear Physics.
London, W.1.

PSYCHIATRY AND THE PUBLIC-HEALTH SERVICES

SIR,—Sir Laurence Brock in your last issue says that "the educationists argue, not without reason, that the difficult child is primarily an educational problem" and that "it is claimed that the non-medical educational psychologist is the best-qualified person to examine the child in the first instance." If this were the general view throughout the educational world Sir Laurence would be justified in his later remark that "the claim of the local education authorities to provide and control child-guidance centres cannot be contested with any hope of success." But although there may be some educationists who hold such a view, school medical officers of local education authorities, under whose supervision so many flourishing child-guidance clinics have recently been established, hold very different views, which were stated in no uncertain terms in *Public Health* for January, 1946. They fully realise the medico-psychological character of the cases and advocate that the work should be in the hands of medical psychiatrists with adequate training and experience in child psychiatry.

Sir Laurence goes on to suggest that there should be child-guidance *centres* under the education authority and child-guidance *clinics* under the health authority, and that the former would refer to the latter children exhibiting "prima facie" signs of mental instability. Is there not a grave danger in such a dichotomy? If the educational child-guidance centres are to be under the educational psychologists as suggested by Dr. Blacker in his book *Neurosis and the Mental Health Services*, this would mean that the responsibility for referal of appropriate cases would be left to a layman unversed in medico-psychological matters. All who have had experience in child-guidance work know that deep psychological disturbances may be going on in a child before such prima-facie signs make themselves apparent, and such a policy would involve serious risks. The scheme suggested may result in some children having treatment by an educationist who does not realise the medical nature of the cases he is dealing with, and others having treatment by a doctor who cannot be in touch with the child's school life.

Again, we are looking forward to a child-care service, as foreshadowed by Sir Wilson Jameson. Is it wise to split off at this stage from such a possible service the psychological problems of children, which are of so great importance in their ultimate future as adults?

Although the difficulties of the "problem child" may be longstanding and date back to early years, the influence of the teacher and the educational psychologist may be very great not only in detecting them but also in remedying them—it is far greater than most people realise—and there is a likelihood that removal of the clinic out of the educational system may lead to a loss of interest by them.

I would suggest that the policy should be not a separation of the child-guidance clinic from the educational system, but an extension of child-guidance clinics or centres under education authorities, with an adequate supply of educational psychologists having a keen appreciation of the medico-psychological problems of children and of child psychiatrists fully trained and experienced not only in the neuroses and psychoses of adults but also in the maladjustments of children and willing to coöperate fully with the educationists. Such clinics would be readily acceptable to parents and to teachers and would help to break down that prejudice against psychiatrists to which Sir Laurence refers.

A. A. E. NEWTH
Senior School Medical Officer, City of Nottingham.

MASS RADIOGRAPHY

SIR,—I feel compelled, even at this late date, to reply to the many controversial points raised by Dr. Brailsford in your issue of Dec. 22. And I think it should be stated that, although Dr. Brailsford is radiologist to the Birmingham mass-radiography unit, he interprets only the abnormal large films, while the reading of the miniature films is done by the medical officer of the unit.

Even the most enthusiastic supporter of mass radiography would hesitate to claim that it is *the* solution to *all* our problems; however, it is a real advance in the diagnosis of chest diseases, and especially of early pulmonary tuberculosis.

I should be interested to know the evidence for Dr. Brailsford's statement that the large film is definitely superior to the miniature radiogram. Is this based on practical experience? If it is founded on earlier experimental results in America, it should be realised that they differ from results in this country, where we employ specially designed apparatus and lenses and faster film-speeds; the standards here are in every respect higher. I have been privileged recently to meet American and French workers, visiting this country to study our methods, and they have commented on the superiority of our results.

As regards his statement "that disappointment will follow if the well-tried clinical methods are correspondingly neglected," I would point out that most units do *not* neglect a short history, which is taken by the clerks and is found very useful in reporting on the miniature film. Some units go further, and have a chest clinic attached to the mass-radiography unit, where tuberculous, non-tuberculous, and cardiac cases are fully investigated before disposal to dispensary, hospital, or general practitioner. In the Nottingham unit the clinical side has been well developed from the start; this clinic preserves a strictly non-tuberculous character, which ensures that no stigma is attached to anyone who attends it—a useful feature for the observation of the symptomless minimal tuberculous lesion.

Knowing of the prejudice against miniature radiography, I devised the following simple test. By arrangement with the chief tuberculosis officer, the medical director of the unit is notified of any case X-rayed by the unit and passed as normal which is subsequently found to have pulmonary tuberculosis. To date, of 46,000 volunteers, 2 have been notified—an insignificant percentage. In one case, nine months elapsed before X-ray at the dispensary, when a small lesion was found; the second was a boy in continued contact with open tuberculosis, in whom an acute lesion was found after

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an interval of 4 months. As an additional check, these "suspected" miniatures were sent to the consulting radiologist at the Ministry of Health; he reported that both were normal and showed no evidence of pulmonary tuberculosis.

Medical directors have always been taught, at the Ministry of Health training centre, that a large film should invariably be taken in case of doubt;- and a diagnosis is made only from the large film.

I would, however, agree with Dr. Brailsford that a single X-ray gives rise to a false sense of security in the volunteer. I would suggest that each unit takes as many volunteers as it can cope with in a year, and X-rays them every year for three or four years. This would provide useful data, and would be a valuable measure in preventive medicine. The policy of extreme mobility is bad and can serve no useful purpose.

Commenting on the capacity of a unit, Dr. Brailsford says: "300 per hour was first suggested; the more modest number of 1000–1200 per week is attained." This is simply due to war-time shortage of medical, technical, and clerical staff. There is no reason why a single mass X-ray unit should not work three 8-hour shifts a day, at a rate of 120 per hour, thus dealing with 2880 volunteers each day. The chief difficulty is the insufficiency of medical staff to deal with the abnormal case detected. Personally, I think the Ministry of Health is to be congratulated on launching this national scheme in time of war, with all its attendant difficulties. The present scheme, although not large, is efficient, and forms the framework for future expansion when men and equipment become available.

I doubt whether a single person has been misled by the Ministry of Health into thinking that mass radiography would be applied to the whole population—this is precluded by shortage of apparatus and staff. However, the examination is voluntary, and few, if any, voluntary schemes yield 100% response. Nor am I persuaded that the public has been deceived into thinking "that mass radiography would eradicate tuberculosis." Practical experience has shown that propaganda on tuberculosis has been grossly insufficient. It is a common experience amongst directors of units that the percentage-response in a factory is directly proportional to the effort put into the propaganda drive before the unit reaches the factory. The lay public is very ill informed on pulmonary tuberculosis—a state for which we, as a profession, must accept the blame.

Finally, I am sorry to learn that Dr. Brailsford does not believe in the symptomless minimal tuberculous lesion, for undoubtedly these cases do exist and since there are no physical signs can only be detected by radiography.

Mass radiography has demonstrated to me its usefulness in the detection of unsuspected disease, especially pulmonary tuberculosis, of which not only early, but sometimes quite advanced, lesions are found.

A. E. BEYNON
Chest Radiography Centre, Nottingham. Medical Director.

NEW REMEDY FOR LUPUS

SIR,—Your annotation of Jan. 5 (p. 23) records that Dowling and Prosser Thomas have, since 1943, treated 38 cases of lupus vulgaris with massive doses of calciferol, with excellent results, though with a significant incidence of intolerance. I have employed similar treatment since 1941. My first report—on 27 patients, most of whom had recovered more than a year before—was made to the Société Lyonnaise de Dermatologie on July 3, 1943; since then I have published several articles on this method (Société Française de Dermatologie, 1943–45; *J. Méd. Lyon*, July, 1944; *Bull. Acad. Méd. Paris*, October, 1944). These have led to numerous other reports on this treatment, which has been known in this country since 1943 as the "Charpy method."

The preparation used in France, in the dosage I have recommended, is hardly ever associated with intolerance; this is because of its chemical purity, and perhaps also because it is made up in an alcoholic solution and not in oil.

Lupus vulgaris is a disease which has almost completely disappeared from France since 1941.

Dijon, France. JACQUES CHARPY.

SOCIAL ADVENTURE

SIR,—Your leading article of March 2 says:

"Already local authorities provide health visitors for mothers and children, but in future their duty in this respect will probably be enlarged. There should be health visitors (not sick visitors) to supplement the whole range of the family doctor's service and to coöperate in it."

In Cardiff we have already tried and have proved the value of an interesting experiment in the enlargement of the duties of health visitors. A year ago one of them, selected for probable aptitude for the work, started following up diabetics discharged from the Municipal General Hospital (Llandough Hospital). Approximately 50 have passed through her hands. She visits the hospital twice a week and makes contact with all cases before they are discharged. She also discusses them in full with either the physician in charge or the ward sister. Before she started the work she had been thoroughly tutored in the essentials of the medical aftercare of diabetic patients. The medical superintendent, Dr. D. G. Morgan, now informs me that there can be no doubt that, as far as diabetes is concerned, the number of readmissions in coma has been considerably reduced.

The same health visitor's follow-up work has since been extended to gastric cases, but it is too early yet to assess its value for them. We are now considering to what other diseases we shall extend a health-visitor service of this kind. Although that consideration had not occurred to us when we began this service as an experiment, it does now occur to me that if, as seems probable, the municipal hospitals are to be broken away from the rest of the municipal services, it may be all the more important to strengthen links of this kind between the municipal health services and the hospital services.

Public Health Dept., Cardiff. J. GREENWOOD WILSON.

REACTIONS TO REVACCINATION

SIR,—In the article on imported smallpox in your issue of March 9 (p. 360) you speak of agreement that failure to obtain a local reaction to revaccination indicates either lack of potency of the lymph used or a defect in the technique of insertion. I disagree: it is my experience that many immune persons revaccinated properly with potent lymph show no reaction at all. Only in those subjects hypersensitive to calf lymph do "immediate" reactions occur, and hypersensitiveness is *not* synonymous with immunity.

Dartford, Kent. M. MITMAN.

CONTACT DERMATITIS FROM PENICILLIN

SIR,—Dr. Vickers has reported a case of dermatitis caused by penicillin. While agreeing that penicillin should be used externally only for a limited time, I would like to correct any impression he has given that the danger from the external use of penicillin is in any way comparable to the danger from sulphonamides. In all the thousands of cases which we treated with local penicillin in B.L.A., I know of only about half a dozen proved cases of penicillin sensitivity, and these cleared up rapidly when the penicillin was stopped; on the other hand we had at least 800 cases of sulphonamide dermatitis, and there were probably many more which were not labelled as such. Many of these were extremely severe and a majority had to be evacuated to U.K.; many were invalided out of the Army.

In Dr. Vickers's case, he records that penicillin powder was used; this has rather an unfortunate name, as the powder actually contains 1% penicillin and 99% sulphathiazole; I think it is probable that his case may originally have started as a sulphathiazole dermatitis, the skin becoming sensitive to penicillin later.

The introduction of local penicillin in medical units as far forward as field dressing-stations was in part done to provide a substitute for sulphonamides. It should not be used for longer than a week—not because it is dangerous but because any benefit to be derived from penicillin will have been produced by that time. If the lesion has not responded in a week it will never respond to penicillin, and some other treatment should be used.

F. F. HELLIER
Leeds. Late Adviser in Dermatology, 21 Army Group.

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ADHESIVENESS OF BLOOD-PLATELETS

SIR,—In her work on the adhesiveness of platelets (*Lancet*, March 2, and in *J. Path. Bact.*) Dr. Payling Wright gives consideration to Shionoya's hypothesis that a thin film of fibrin deposited on the surface of these bodies might be the cause of their stickiness. A girl suffering from congenital afibrinogenæmia has been under the observation of Dr. Prunty and myself (*Biochem. J.* 1943, **37**, 16), and I have had the opportunity of studying the behaviour of her platelets. They form clumps as quickly as those of the normal person. Further, in a sample of her blood withdrawn into a test-tube, white thrombi were clearly visible firmly adherent to the glass within five minutes of withdrawal. Staining of such thrombi showed that they were composed of platelet clumps together with a variable number of leucocytes. Since exhaustive investigations have failed to reveal any trace of fibrinogen in the girl's blood, it seems that other reasons than that of fibrin formation will have to be sought to explain this interesting property of the platelet. Further details of our investigation will shortly be published.

St. Thomas's Hospital. J. L. PINNIGER.

USE OF ETHER TO ELIMINATE GRAM-NEGATIVE BACILLI

SIR,—Last summer I demonstrated to the Pathological Society, and published [1] a method of suppressing coliforms in routine cultures by exposing inoculated blood plates to ether. My results were very similar to those now described by Dr. Pearce except that there was considerable variation in the sensitivity to ether among different strains of streptococci. At the same meeting Dr. Keith Rogers demonstrated his method of suppressing coliforms by shaking inocula with toluene with results which I thought were more impressive than mine.

The credit for first using ether for its action on coliforms goes to Waterhouse [2] who used to pour it into the abdominal cavity in cases of peritonitis. This led to the investigation of the antiseptic properties of ether by Topley,[3] who found that immersion of *Bact. coli* in 50% ether was fatal to this organism in three minutes at room temperature.

A revival of the method of Waterhouse in the treatment of body cavities—e.g., empyema—infected with gram-negative bacilli might give results of interest.

London. JOHN S. B. BRAY.

*** Another correspondent points out that a technique similar to that described by Dr. Pearce is mentioned in the *M.R.C. Special Report*, no. 51 (on the laboratory diagnosis of acute intestinal infections), 1920, p. 35, which quotes Bierast (*Zbl. Bakt.* 1914, **74**, 348) and Hall (*Berl. klin. Wschr.* 1915, **52**, 1326).

EX-SERVICES MEDICAL SOCIETY

SIR,—As one who hopes to be released shortly, I read the letter by "Ex-Service M.O." (March 2) with interest but some distrust. He is, I feel, applying the wrong answer to the problem, real or imagined, which he sees.

If it does exist, then surely it is not isolated, but part of the greater problem—whither medicine, now? As such, it should be handled not by yet another society but by a subcommittee of an existing society. The profession needs greater unity within itself rather than division, of which there is already more than enough. If this ex-Service doctor's suggestion were carried to its logical conclusion, we should soon have a multiplicity of new societies, based on the theatres of war in which we served and our status as specialists or general-duty officers.

Assuming that the problem exists, I suggest that the B.M.A. set up a committee consisting of civilian specialists and general practitioners, and ex-Service specialists and R.M.O.s. This committee should discuss what each side has to offer the other, and what each side wants from the other. I suggest the B.M.A. rather than any other society, because it has these qualifications: (1) it is not avowedly political; (2) it is already dealing with the greater problem; and (3) it represents all branches of the profession. R.M.O.

1. *J. Path. Bact.* 1945, **57**, 395.
2. *Brit. med. J.* 1915, i, 233.
3. *Ibid*, p. 237.

Obituary

ROBERT KLABER

M.D. LOND., F.R.C.P.

Dr. Klaber, who died on March 2 at the age of 45, was one of the ablest of the younger generation of dermatologists. From Tonbridge School he went to St. Bartholomew's Hospital, where he won the Burrowes and Skynner prizes and was proxime accessit in the Brackenbury scholarship. After qualifying in 1923 he served as house-physician and house-surgeon at the Radcliffe Infirmary, Oxford, and the following year graduated M.B. He obtained diplomas in public health and in tropical medicine, and the M.R.C.P., and continued his dermatological studies in Vienna before, in 1929, he was appointed junior demonstrator in pathology and clinical assistant in the skin department at Bart's. Four years later he became a chief assistant in the department, and at the same time took over the charge of the skin department at the Prince of Wales's General Hospital, Tottenham, where he was also a lecturer in the North-East London Postgraduate College.

At the outbreak of war Klaber became consulting dermatologist to sector II, E.M.S., and later he organised the skin unit at the Haymeads Hospital at Bishop's Stortford. He was also for some time consulting dermatologist to the Harrow and Wealdstone Hospital, to the L.C.C., and, at the time of his death, to the Luton and Dunstable Hospital, and he served as secretary to the section of dermatology of the Royal Society of Medicine from 1938 to 1940 and again jointly in 1940–41, and as local secretary to the British Association of Dermatology. In 1939, with Wittkower, he reviewed the pathogenesis of rosacea with special reference to emotional factors, and he also wrote on phyto-photo-dermatitis and the treatment of boils. He was elected F.R.C.P. in 1941.

An enthusiastic gardener, a delightful host, and an admirable colleague, Dr. Klaber will be missed by the staffs of the hospitals which he served as well as by his friends in dermatology. He leaves a widow and two young children.

H. P. LIE

M.D.

ON Dec. 17, 1945, Dr. Lie, who was for many years the highest authority on leprosy in Scandinavia, died in Norway. He was the successor of Armauer Hansen, the discoverer of the bacillus of leprosy in 1873, a decade before the discovery of the tubercle bacillus. Born in 1862, Lie was early associated with the campaign against leprosy in Norway, where its victims numbered nearly 3000 in 1856. Now they number 23. In 1893 Lie was appointed assistant to Hansen, then head of the Norwegian Leprosy Service, and in 1909 he was the secretary-general of the Second International Leprosy Congress held in Bergen under Hansen's presidency. The success of this congress was largely due to Lie's gifts for organisation. In 1911, on Hansen's death, Lie succeeded him as head of the Leprosy Service, and he remained in this post till he reached the age-limit in 1935. His innumerable contacts with the outer world were reflected in his membership of various foreign medical societies. In Norway he took an active interest in many spheres, scientific and political, but abroad he was best known as the Grand Old Man in the world of leprosy.

VINCENT CHARLES ROBINSON

M.B. CAMB., M.R.C.P.

Dr. V. C. Robinson, who died at the Brompton Hospital on Dec. 30, had been burdened throughout his life by illness, yet his interests and abilities were many-sided. He was a fine clinician, patient and thorough, while his wide scholarship made him a versatile conversationalist, and he was also a skilful writer. A capable musician, he had taught himself the clarinet and he often played in amateur orchestras and quartets. In 1923 he obtained a first-class in the natural sciences tripos, and he took the Conjoint qualification from St. Bartholomew's Hospital in 1929. After holding a clinical assistantship at the St. John Clinic, Pimlico, he became chief assistant to the electrical department at Bart's.

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During the war as an E.M.S. physician he had worked at the Central Middlesex Hospital, and one of his colleagues there writes: "Doctors, nurses, ward-maids, and patients all found Robbie's combination of charm, sympathy, and humour something quite out of the ordinary. Deeply interested in his patients apart from their illnesses, he realised better than most of us the importance of their homes and habits. 'Oh, I wanted to see Dr. Robinson. He knows all about me,' was a familiar remark when he was away ill. His quick wit and sense of humour were a delightful seasoning to his conversation, and his gaiety and sparkle were the more striking because of their contrast with his serious and almost melancholy face. But though he laughed at others he never mocked, and though he chided them he never sneered. There seemed no bitterness in him at all and that was why he could get on with people whose ideas were entirely different from his own. His lively mind was not satisfied by any ready-made set of ideas and he was a devout pagan. Yet his sincerity and honesty were such that he could discuss atheism with the most rigid believer without giving offence. And he never ceased the vain search for a creed that would satisfy both his rationalism and his idealism."

EDMUND NOBEL

M.D. VIENNA

Professor Nobel, who died in London on Jan. 26 at the age of 62, was a distinguished figure in the cause of child welfare. Of Jewish origin, he was born in 1883 at Gran in Hungary. He graduated in 1910 at the University of Vienna, and held posts under von Noorden at the First Medical Clinic in Vienna, and under von Leube at Würzburg. In 1911 he was appointed assistant to von Pirquet at the Breslau Kinderklinik, and shortly afterwards went to Vienna with von Pirquet when he was appointed director of the University Kinderklinik.

Between 1919 and 1922, when the children of Vienna and of all Austria were suffering acutely from shortage of food, Dr. Nobel acted as lieutenant to von Pirquet, who was commissioner for the Amerikanische Kinderhilfsaktion. Together they tackled the feeding of Austrian children, and Nobel was mainly responsible for organising daily hot meals for as many as 200,000 in Vienna and the provinces. Once, when a disastrous fire destroyed a huge kitchen which served some thousands of children, alternative places were swiftly equipped by his organising genius, and the new distributing centres were working at full strength within twenty-four hours.

In later years Nobel investigated the incidence of goitre among Viennese children, and was concerned in measures taken for its prevention by the addition of iodine to one of the sources of the Vienna water-supply. This proved so successful that he was asked to visit Belgium and initiate similar measures for the prevention of endemic goitre in that country. He also worked on behalf of the health organisation of the League of Nations, and he was often seen at Geneva as the Austrian representative at international conferences.

When the Nazis invaded Austria in 1938, Nobel was chief physician at the Mautner-Markhof municipal hospital for children in Vienna. He was removed from these posts on racial grounds, and later in the same year was denied the right to private practice. It was ironical that this physician, to whom Vienna, and especially its rising generation, owed so much, should have been made to feel himself unwanted.

In October, 1938, Nobel accepted an invitation from the government of Albania to organise a children's hospital and child-welfare service in Tirana, the capital; but, with the Italian invasion in the spring of 1939, he was obliged to relinquish his position. When he arrived in this country as a refugee a few months later he qualified to practise; and he held appointments at Queen Mary's Hospital for Children, Carshalton, and at the infant clinic of St. Pancras borough council. He was for several years school medical officer to the L.C.C. and to the Essex County Council, and was finally appointed physician to the Paddington Green Children's Hospital. He also established a consulting practice.

A colleague writes: "Professor Nobel had a great reverence for his teacher and old chief, von Pirquet, whom he had succeeded. At Paddington Green he gathered round him a large clientele of mothers, who valued his skill and his gentle manner; it gave him great satisfaction and happiness to be working once again in a children's hospital. He was a quiet and kindly physician, who loved the children he served."

FRANK EDWARD SCRASE

F.R.C.S., D.P.H.

WHEN Dr. Scrase was appointed medical officer of health for Hampstead in 1912, he brought to his new post a background of experience in local government and practice which stood him in good stead. He had been a member of Hampstead's first borough council in 1900, and a district medical officer there under the poor-law; and the local doctors gave their former colleague willing coöperation in his campaign against tuberculosis and in the development of the maternity and child-welfare services. Antenatal clinics were set up, and health visitors appointed, while Dr. Scrase himself undertook the investigation of each case of illness or death occurring in a parturient woman in the borough. This valuable pioneer work is today continued by a medical subcommittee of the borough council. He held that preventable illnesses causing absence from school "should be almost unknown among children born and reared in Hampstead" and did his best to make his words come true. His work among the women and children strengthened his interest in housing, and in each of his annual reports he published a table showing the number of people living in one-roomed, two-roomed, and three-roomed homes where a mother had been confined.

Dr. Scrase, who received his medical training at Bristol and St. Bartholomew's Hospital, took the conjoint qualification in 1893 and the F.R.C.S. three years later. In 1905 he obtained the D.P.H. Before his retirement in 1932 he served a term as president of the metropolitan branch of the Society of Medical Officers of Health, and during the war he was chairman of the local medical war committee. He died at Newton Abbot on Feb. 4.

THE LATE DR. BARRIS

Surgeon-Lieutenant J. B. Gurney Smith, R.N.V.R., writes: Of all the clinical staff at Bart's when I was a student none could rival Dr. Barris in academic brilliance as a teacher. His lectures on obstetrics and gynæcology, and his ward rounds, were masterpieces of instruction, and all bore the indelible imprint of a great man. His teaching was always a source of mental enrichment and inspiration. Humanity and loyalty to Bart's were his predominant qualities. How often during a round in Martha Ward would he say, "Gentlemen, we are not considering a case of fibroids, but a woman who has fibroids." To observe him conversing with a patient was to witness the authentic clinical approach. He knew how to make a patient, especially a nervous young woman, feel perfectly at ease. His devotion to his alma mater was always apparent. I recall as a first-year student attending a freshmen's social during the year when he was president of the Students' Union. His address to us newcomers still lives in my memory as he painted a wonderful picture of our new environment and extolled the grandeur of Bart's. His reference to the famous "square" as "the soul of Bart's," I have always thought an apt description of that hallowed ground. His smile, his slow gait, and his courteous dignified manner all left a permanent impression on one's mind.

THE council of the British Medical Association will consider an award in 1947 of the Katherine Bishop Harman prize for an essay concerned with diminishing the risks of pregnancy and childbearing. The value of the prize is £75 and entries should reach the secretary of the B.M.A., Tavistock Square, London, W.C.1, by the end of this year.

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Notes and News

EXTENSION OF L.C.C. FREE AMBULANCE SERVICE

THE ambulance service of the London County Council has in the past charged a fee for the removal of patients to voluntary hospitals. From April 1 patients will be removed from any address in the county of London to the ordinary wards of any voluntary hospital in the county free of charge to themselves or the hospital. The existing charges will continue for patients admitted to paying wards. It is hoped that this free service will later be still further extended, but for the present a charge will still be made for discharged patients in need of an ambulance on medical grounds; out-patients receiving treatment; and removals to or from places outside the county of London.

Applications for the use of a free ambulance will be accepted by the headquarters of the London Ambulance Service (WATerloo 3311) only from the voluntary hospitals in the county of London or the Emergency Bed Service. Doctors should not apply directly to the London Ambulance Service, but to be sure that a bed has been definitely obtained they should make arrangements for the patient's admission with either the voluntary hospital concerned or the Emergency Bed Service (CLErkenwell 6571; CITy 2162).

MEDICAL SPECIALISTS LECTURE IN POLAND

IN Poland, as in all liberated countries, professional men are eagerly demanding opportunities to catch up with the lost years. In particular, doctors are impatient to receive information concerning the advances made elsewhere in 1939–46. To meet this demand, Dr. Wilbur Sawyer, chief of the UNRRA health division in Washington, made a tour of Poland last autumn, lecturing on influenza, yellow fever, and insect vector control. The success of his tour has led UNRRA to send other specialists to make similar tours. From Britain Dr. N. H. Martin has lectured on nutrition, and Dr. Marc Daniels is now lecturing on tuberculosis and making a survey of the disease in Poland. Dr. Nevitt, from the U.S.A., has instructed Polish doctors on the latest use of plastics in dentistry. Russian authorities on physiology and tuberculosis will probably visit Poland in the near future.

GYMNASTIC INSTRUCTORS FOR REHABILITATION

Pinderfields Hospital, Wakefield, has been chosen by the Ministry of Health as the training centre for 150 ex-Service physical-training instructors in a six months' course of medical gymnastics. At a recent demonstration, reported in the *Manchester Guardian* of March 9, Dr. J. H. Balme, of the Ministry of Health, said that formerly rehabilitation had been attacked only piecemeal; it was an individual problem, which must be surveyed as a whole to prevent uncared-for disability becoming permanent and an economic handicap. Remedial gymnasts would work in rehabilitation centres and industrial health centres, or under school medical officers to correct postural defects or poor physique in children. Lord Pakenham, deputising for Mr. Arthur Greenwood, said the Government was determined that opportunities for rehabilitation after illness or injury should form an integral part of the new National Health Service. Sir Wilson Jameson, chief medical officer to the Ministry of Health, said that rehabilitation centres had been one of the most important developments of the war; whereas in 1943 there had been 48 centres with all facilities for rehabilitation, there were 204 in 1945; and there were now 333 centres with good facilities.

MEDICAL SOCIETY OF LONDON

SPEAKING at the annual dinner on March 8, Sir ALAN HERBERT, M.P., expressed misgiving about the one-man businesses of the doctor and author. Were there soon to be a standard book (with foreword by Herbert Morrison), a standard baby (for export), and a standard duodenal ulcer (to Government specification)? His charge against the present Government was not one of inefficiency but of arrogance, and in dealing with his friend Aneurin Bevan the profession would do well to use a long spoon. In confidential talks the Minister had told the doctors' representatives that they were to be executed but must not say a word about it until their head was brought on a platter to the House of Commons; by which time, in view of the Labour majority, there would be no chance of doing anything about it; so he recommended a campaign *now*. Reading a letter by Lettsom, founder of the society, he doubted whether the springs that nourished the work of such a man would still run in a State organisation. Sir JAMES WALTON, the president, said he believed the profession should be entirely non-political but should carry much greater advisory weight in matters such as housing. Having gained the trust of the public—indeed to a wonderful extent—it might be able to gain equal trust from the Government. But it must speak with one voice, and he hoped for closer union of professional bodies. He feared, under the new organisation, a loss of the sense of responsibility: doctors were brought up to take responsibility but civil servants to evade it. Freedom from financial anxiety would, however, be a great gain for the young man. The discoveries of medicine, Sir James thought, were in general not achieved by individuals but by small aggregations of knowledge aired in medical societies. The Medical Society of London was founded in 1773, and as only 6 or 7 of its anniversary dinners had been missed this was the 166th. It was one of the most valuable societies because it was entirely unspecialised, contributions being made by every branch of the profession. It had remained active throughout the war, but of some 500 members 76 had died since 1939. It was now rather more than 100 below strength, and he looked forward in future to a larger part in its deliberations being taken by general practitioners. There was, he felt, as great an opportunity as ever before for research in clinical medicine.

WORTHINGTON MEMORIAL EXHIBITION

THE exhibition of the works of the late Robert Worthington of Exeter will open at the gallery of the Fine Arts Society, New Bond Street, London, W.1, on March 20. Our note last week (March 9, p. 367) unfortunately anticipated the opening, and we hope that disappointed visitors will accept our apologies and repeat their visit before the exhibition closes on April 6th.

University of Oxford

On March 2 the following degrees were conferred:—

D.M.—J. L. Pinniger.
B.M.—J. C. Gillett and *M. H. C. Williams.
* In absence.

University of Cambridge

Sir HOWARD FLOREY, F.R.S., professor of pathology in the University of Oxford, has been elected an honorary fellow of Gonville and Caius College.

Courses for demobilised medical officers.—As announced in our issue of Feb. 23 courses will be held in general medicine at Southend during April, and in social and industrial medicine at Luton during May. The course at Addenbrooke's Hospital, Cambridge, during July has been cancelled.

University of Sheffield

Dr. J. D. Morgan has been appointed temporary demonstrator in anatomy.

Royal College of Surgeons of England

Lectures will be delivered at the college at 5 P.M. on the following dates during April: 1st, Sir Heneage Ogilvie (Inguinal Herniæ); 3rd, Prof. John Morley (Surgery of the Stomach); 4th, Mr. R. Maingot (Surgery of the Spleen); 8th, Mr. L. E. C. Norbury (Surgery of the Rectum); 10th, Prof. H. J. Seddon (Peripheral Nerve Lesions); 11th, Surgeon Rear-Admiral Sir Gordon Gordon-Taylor (Surgery of the Colon); 15th, Mr. W. Rowley Bristow (Joint Injuries); 16th, Mr. E. W. Riches (Surgery of the Prostate); 17th, Mr. V. E. Negus (Injuries of the Ear, Nose, and Throat); 24th, Mr. J. B. Hunter (Surgery of the Heart); 25th, Sir Reginald Watson-Jones (Fractures of the Pelvic Girdle); 26th, Mr. T. Pomfret Kilner (Pedicle Grafting).

Return to Practice

The Central Medical War Committee announces that the following have resumed civilian practice:—

Mr. CHARLES COCKBURN, F.R.C.S.E., 10, Rubislaw Terrace, Aberdeen.
Dr. S. H. FOULKES, 58, Portland Place, W.1.

Grants for Research

The Ella Sachs Plotz Foundation makes grants for the purchase of apparatus and supplies needed for special investigations, and for the payment of unusual expenses, including technical assistance, but not for providing apparatus or materials which are ordinarily a part of laboratory equipment. The maximum grants are usually less than $500, and stipends are granted only in exceptional circumstances. Applications for the year 1946–47 should be sent before April 15 to Dr. Joseph C. Aub, Massachusetts General Hospital, Fruit Street, Boston 14, Mass., U.S.A.

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Royal Appointments

Brigadier FREDERICK HARRIS, C.B.E., M.C., late R.A.M.C., has been appointed honorary surgeon to the King in succession to Major-General D. T. Richardson, and Brigadier H. A. SANDIFORD, M.C., late R.A.M.C., honorary physician in succession to Major-General L. T. Poole.

Royal Medico-Psychological Association

The next quarterly meeting will be held at The Retreat, York, on May 17; the subjects will include Child Psychiatry and the History of The Retreat. The annual meeting will be held at the Royal College of Physicians, Edinburgh, on July 17–19.

New Tuberculosis Journal

The National Association for the Prevention of Tuberculosis (Tavistock House North, Tavistock Square, London, W.C.1) announce that in April, on behalf of the Tuberculosis Educational Institute, they will publish the first issue of a new quarterly, *Tuberculosis Index and Abstracts of Current Literature*. It will provide a full list of current articles on tuberculosis and abstracts of many of them. Dr. J. H. Harley Williams will be the editor and Dr. Frederick Heaf chairman of the editorial board.

Old Age in the New World

On March 11 Mr. Charles Key, parliamentary secretary to the Ministry of Health, opened an exhibition organised by the National Old People's Welfare Committee at County Hall, Westminster Bridge, London, S.E.1, showing how the needs of old age may be met in the new world. The exhibition, which consists of photographs and plans showing how the housing and other needs of old age can be met by local authorities and voluntary organisations, will remain at County Hall till March 23, and afterwards it will visit the West of England, the Midlands, North Wales, and Edinburgh.

Medical Diary

MARCH 17 TO 23

Monday, 18th

ROYAL SOCIETY OF MEDICINE
5 P.M. Surgeon Captain Macdonald Critchley, Dr. W. S. Ladell, Colonel L. B. Stott: Cold and Heat.

Tuesday, 19th

ROYAL COLLEGE OF PHYSICIANS OF LONDON, Pall Mall East, S.W.1
5 P.M. Dr. R. D. Lawrence: A Case of Lipodystrophy and Hepatomegaly with Diabetes, Lipæmia, and other strange Metabolic Disturbances suggesting a New Aspect of Insulin Action. (First of two Oliver-Sharpey lectures.)

ROYAL SOCIETY OF MEDICINE
4 P.M. (Chester Beatty Research Institute, Royal Cancer Hospital, S.W.3.) *Pathology.* Demonstrations.
5 P.M. Dr. R. B. Bourdillon, Major H. Cardwell: Burns. Prof. R. A. Peters, F.R.S.: B.A.L. Prof. S. Zuckerman, F.R.S.: Missiles and Blast.

EUGENICS SOCIETY
5.30 P.M. (Burlington House, Piccadilly, W.1.) Dr. C. P. Blacker: Galton's Outlook on Religion.

Wednesday, 20th

ROYAL SOCIETY OF MEDICINE
5 P.M. Brigadier Hugh Cairns: Crash Helmets. Squadron-Leader B. J. O. Winfield: Paratroops. Squadron-Leader S. Davidson: Linear and Centrifugal Acceleration. Dr. Brian McArdle: Sea and Air Sickness.

ROYAL INSTITUTE OF PUBLIC HEALTH AND HYGIENE, 28, Portland Place, W.1
3.30 P.M. Dr. William Gunn: Control of Gastro-intestinal Infections—including Dysentery.

Thursday, 21st

ROYAL SOCIETY OF MEDICINE
5 P.M. Dr. G. M. Morant: Anthropometric Problems. Dr. A. G. McD. Weddell: Design of Work-space, &c.

ROYAL COLLEGE OF PHYSICIANS OF LONDON
5 P.M. Dr. R. D. Lawrence. (Second of two Oliver-Sharpey lectures.)

ROYAL SOCIETY OF TROPICAL MEDICINE AND HYGIENE
8 P.M. (School of Tropical Medicine, Pembroke Place, Liverpool, 3.) Laboratory meeting and demonstrations.

ROYAL INSTITUTION OF GREAT BRITAIN, 21, Albemarle Street, W.1
5.15 P.M. Sir Henry Dale, O.M.: Chemical Transmitters of the Effects of Nervous Impulses. (Last of four weekly lectures.)

Friday, 22nd

ROYAL SOCIETY OF MEDICINE
3 P.M. (11, Chandos Street, W.1.) *Epidemiology and State Medicine.* Dr. F. O. MacCallum, Dr. W. H. Bradley: Homologous Serum Jaundice.
4.30 P.M. (Hospital for Sick Children, Great Ormond Street, W.C.1.) *Disease in Children.* (Cases at 3.30 P.M.)
5 P.M. Lieut.-Colonel H. D. Chalke: Typhus. Dr. Forrest Fulton: Scrub Typhus. Brigadier G. A. Macdonald and Mr. K. Mellanby, D.SC.: Entomological Problems.

INFECTIOUS DISEASE IN ENGLAND AND WALES

WEEK ENDED MARCH 2

Notifications.—Infectious disease: smallpox, 8 (4 imported cases at Liverpool, 1 imported case at Scarborough, 3 cases at Thurrock); scarlet fever, 1232; whooping-cough, 1605; diphtheria, 501; paratyphoid, 23; typhoid, 8; measles (excluding rubella), 1583; pneumonia (primary or influenzal), 860; cerebrospinal fever, 70; poliomyelitis, 7; polio-encephalitis, 1; encephalitis lethargica, 3; dysentery, 323; puerperal pyrexia, 126; ophthalmia neonatorum, 59. No case of cholera or typhus was notified during the week.

The number of service and civilian sick in the Infectious Hospitals of the London County Council on Feb. 27 was 991. During the previous week the following cases were admitted: scarlet fever, 46; diphtheria, 35; measles, 37; whooping-cough, 12.

Deaths.—In 126 great towns there were no deaths from enteric fever, 2 (0) from scarlet fever, 2 (1) from measles, 13 (0) from whooping-cough, 9 (0) from diphtheria, 57 (10) from diarrhœa and enteritis under two years, and 123 (14) from influenza.

Birmingham reported 8 deaths from influenza, Manchester 7. There were 3 fatal cases of whooping-cough at Sheffield.

The number of stillbirths notified during the week was 216 (corresponding to a rate of 28 per thousand total births), including 32 in London.

Births, Marriages, and Deaths

BIRTHS

CLEGG.—On March 5, in London, the wife of Dr. John Clegg—a daughter.
GARROW.—On March 1, in London, the wife of Surgeon-Lieutenant Donald Garrow, R.N.V.R.—a son.
LUCAS.—On March 3, in London, the wife of Dr. B. G. B. Lucas—a son.
PATTISON.—On Feb. 24, at Newport, Mon, the wife of Surgeon Lieutenant Peter Pattison, R.N.V.R.—a son.
PINKERTON.—On March 5, at Hitchin, Herts, the wife of Captain G. E. Pinkerton, M.C., R.A.M.C.—a son.
RUSSELL DAVIS.—On March 3, at Cambridge, the wife of Dr. D. Russell Davis—a daughter.
SMITH.—On March 4, at Oxford, the wife of Major Peter Smith, R.A.M.C.—a daughter.

MARRIAGES

HILL—KNOX.—On March 2, at Singapore, Adrian Hill, captain R.A.M.C., to Kathleen Mary Knox, captain R.A.M.C.
MORRISON—SNOW.—On Feb. 20, in London, John Neill Morrison, surgeon lieut.-commander R.N.V.R., to Mifanwy Closs Snow.
O'DONNELL—REID.—On Feb. 28, in Dublin, James Edward O'Donnell, major I.M.S., to Patricia Reid.

DEATHS

BETT.—On March 3, William Bett, C.B., M.V.O., M.R.C.S., surgeon rear-admiral, of Christchurch, aged 82.
CLEMENTS.—On March 3, in London, John Edmund Clements M.B. R.U.I., lieut.-colonel I.M.S. retd., aged 71.
DIXON.—On March 3, at Sidcup, Augustus Edward Dixon, M.D. Dubl., F.C.S., emeritus professor of chemistry, University College, Cork, aged 85.
DOBIE.—On March 3, at Chester, Williams Henry Dobie, M.B. Edin., aged 89.
KLABER.—On March 2, in London, Robert Klaber, M.D. Lond., F.R.C.P., aged 45.
MCBRIDE.—On March 6, at York, James Graham McBride, M.B. Edin., F.R.C.S.E.
PAGE.—On March 4, at Handcross, Sussex, Algernon Fountain Page, M.R.C.S., aged 72.
PALMER.—On March 2, at Norwich, Horace Kemp Palmer, M.R.C.S., lieut.-colonel R.A.M.C. retd., aged 72.
ROTHERHAM.—On March 3, Arthur Rotherham, M.B. Camb., aged 76.
STOCKMAN.—On Feb. 27, in Edinburgh, Ralph Stockman, M.D. Edin.
STORRS.—On March 4, at Bedford, Charles Simonds Storrs, M.D. Camb.

Appointments

BELL, A. DOYNE, D.M. Oxfd, M.R.C.P.: physician to the children's department, Charing Cross Hospital, London.
EVANS, E. STANLEY, M.B. Lond., F.R.C.S.: medical superintendent, Lord Mayor Treloar Cripples' Hospital and College, Alton, Hants.
POTTS, R. E., M.B., B.SC. Glasg.: pathologist, Kilmarnock Infirmary.

Nottingham General Hospital.—The following appointments are announced:—
MOWAT, W. J., M.D. Edin.: radiologist.
GORDON, Major F. M., M.B. Edin., D.R.: asst. radiologist.
HEPWORTH, Colonel S. M., M.B. Leeds, D.M.R.E.: radiological registrar.

South Eastern Hospital for Children, Sydenham.—The following appointments are announced:—
ROLES, FRANCIS, M.R.C.P.: asst. physician.
SMITH, RODNEY, M.S. Lond., F.R.C.S.: asst. surgeon.
MONAIR, DOROTHY, M.D. Lond.: anæsthetist.
ALLPORT, ANNIE, M.R.C.S.: anæsthetist.
LITTLER, E. L., M.R.C.S.: anæsthetist.

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THE SEARCH FOR A PHILOSOPHY OF MEDICINE *

DOUGLAS GUTHRIE
M.D. Edin., F.R.C.S.E.
LECTURER ON THE HISTORY OF MEDICINE IN THE UNIVERSITY OF EDINBURGH

THE most logical introduction to any field of learning is a study of its history. If we are unfamiliar with the past, we cannot hope to understand the present. The teacher of art, economics, philosophy, music, or of various other branches of knowledge is wont to preface his course of instruction with an account of the rise and development of the subject, and of its advance and progress towards the present-day standard.

In medicine, and perhaps also in some of the sciences, there is an unfortunate tendency to belittle or even to neglect the past. The medicine of our forefathers is regarded as something quaint and curious, often absurd, and at times amusing, but useless and obsolete when viewed in the light of modern knowledge.

This narrow view is as unfortunate as it is fallacious. The enormous accumulation of facts and the multiplication of discoveries have increased, rather than diminished, the necessity for a backward view. Many scientists confront the vast mass of new knowledge with a feeling of apprehension, and it is not surprising that some of our leading thinkers have dared to suggest that the pace has been too rapid, and that a little slackening of the speed might enable us to make a fuller use of the information already at our disposal. Although there is this strong temptation to apply the brake, clearly there can be no delay in the advance of medicine. Nevertheless the balance may be readjusted by cultivating a closer acquaintance with the great masters, by noting how they too faced the difficulties of their times, and by reading for ourselves some of their classic writings, which still deserve to be remembered.

NEED FOR AN HISTORICAL BACKGROUND

The need for an historical background to the study of medicine is becoming more and more obvious. Unfortunately, however, the student is almost overwhelmed by the mass of technical detail with which he must be familiar, at least on the day of examination, if not also in the subsequent practice of his profession. He graduates an expert in modern medical technique yet knowing little of the pioneer work upon which modern medicine is founded. It is obviously inadvisable to add another subject to the overcrowded curriculum, but every medical school might well provide optional facilities for the instruction of the student in the history of his profession. Professor Whitehead has somewhere remarked that "the main business of universities is to promote among students a balance of mind devoted in equal measure to detailed facts and abstract generalisations." Of detailed facts we have more than enough in medicine; let us beware lest the general principles be neglected.

No doubt some such argument has led the university court of Edinburgh University to revive the lectureship in the history of medicine, so ably filled for more than thirty years by the late Dr. John D. Comrie, a scholarly historian who achieved an international reputation by his contributions to the subject, especially by his excellent *History of Scottish Medicine*. It is only fitting that due tribute should be paid to one whose teaching has influenced many generations of students. Dr. Comrie was not the first in Edinburgh to give courses of lectures on the subject. An earlier physician to the Royal Infirmary and a consultant of high repute, Dr. James Warburton Begbie, delivered a short annual series of lectures on the history of medicine, in the Extramural School, for eight years, beginning in 1857.

APPROACH TO MEDICAL HISTORY

History has been made since Begbie's day and even since Comrie's day, and the methods of presenting the subject have altered considerably. The field is so vast and varied that it may be approached from many angles, and he who would teach it may find himself embarrassed by the numerous gates through which he may enter. Naturally, he must maintain a chronological order. Unfortunately for the student, as for the schoolboy, some knowledge of dates is essential. But that is almost the only definite rule. In the manner of presentation a wide choice is open to the teacher. He may present a series of chosen biographies, giving an account of the lives and work of the pioneers. History approached from the biographical angle supplies a stimulus and an encouragement, and acts as a leaven to the technical detail of modern medicine.

Oliver Wendell Holmes, when he was professor of anatomy at Boston, used to tell his class how the great French surgeon Velpeau, who was the son of a blacksmith, came to Paris as a lad, almost starving, and walking in his wooden shoes. "You see, gentlemen," said Oliver Wendell, "a good head over a pair of wooden shoes is a great deal better than a wooden head belonging to an owner whose feet are shod in calf-skin."

History may also be studied from the national or local point of view; the student being naturally interested in the rise and development of medicine in his own country, or in his own medical school. The history of diseases, and of the changes which have taken place in the incidence and severity of various maladies, is a suggestive study; and even more far-reaching in its interest is the history of epidemics and of the influence which such plagues as the Black Death or the Sweating Sickness exerted on the march of civilisation.

Sometimes the lives of whole nations have been altered by disease, as also have the lives of individuals. And if the individual is a talented person, the result of his ill-health may affect the course of art, literature, or politics. Recollect the effect of the blindness of Milton, the deafness of Beethoven, the vertigo of Dean Swift, the gastritis of Napoleon; all of which have been chronicled in detail.

Again, the history of public health and of what is now known as social medicine is well worthy of attention. When Greece and Rome were the centres of civilisation, the individual was of less importance than the State, and the seed of social medicine was planted then. During later times Christianity emphasised individualism, but quite recently the pendulum has swung again towards the socialisation of medicine.

Each special branch of medicine has its history. Some are very ancient; others have arisen from the invention of new techniques or instruments, such as Roentgen rays and the laryngoscope. War has sometimes initiated discoveries and advances in naval and military medicine and surgery, which have been adapted subsequently to meet civilian needs.

The medical literature of the past offers another great field for study. Although it contains much that is now obsolete, it is also rich in sensible advice and clear description. The history of medicine is not all contained in books. One may learn much from a study of skulls of prehistoric date, of Egyptian mummies, of drug jars, of ancient instruments, of coins and commemoration medals, and of postage stamps. So even philately is linked with medical history, which is indeed a many-sided subject.

PHILOSOPHY OF MEDICINE

There is another aspect of the history of medicine, more important and far-reaching than any of those already mentioned. It is the study of the systems and trends and motives in medicine, the age-long search for a philosophy.

* An introductory lecture delivered at the University of Edinburgh on Jan. 22, 1946.

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The earliest medical man was a magician or sorcerer. He moved in an aura of mystery and, regarding disease as devil possession, he sought to expel the demon by trephining the skull of the patient, by administering some particularly nauseous remedy, or by the use of charms or incantations.

The next stage was that in which the medical man appeared as a priest. He practised the healing art in the temples, dedicated first to Apollo and subsequently to Æsculapius. This cult persisted for centuries, and traces of it may still be found in Southern Europe.

The passage of medicine from the hands of the priest into those of the philosopher was a notable advance, and it was in ancient Greece, the birthplace of philosophy and of scientific medicine, that the transition took place. Philosophy paved the way for medicine in Greece, where many philosophers were also physicians; and since that time medicine has been deeply influenced by current philosophy.

In the first great medical school of Europe, that of Salerno, the study of medicine was preceded by a three-year course of logic—a most sensible rule. The leading exponent of British medicine of the 18th century, William Cullen, was wont to preface his lectures with the statement: "It shall be my endeavour to make you philosophers as well as physicians." And in our own day, when medicine has become mechanised and specialised almost beyond recognition, the need for a philosophic basis is greater than ever. The edifice has grown almost too massive for the foundations, and it seems desirable that the builders should pause, to ascertain whether those foundations can support any further addition to the superstructure.

At this stage it may be advisable to define the term "philosophy," as it is one of those words which has changed its meaning and is now applied somewhat loosely. "Philosophia," the love of wisdom, was the name given by Pythagoras to the study of the principles and causes of all things. It was originally an all-embracing subject, "the completely-unified knowledge," as Herbert Spencer called it, although now, owing to the growth of daughter sciences, its field is more limited. The word is often used in an adjectival sense, and as a synonym for "theory." Accordingly, we speak of the philosophy of science, or of medicine, meaning the first principles or theoretical basis of the subject, in contradistinction to its practice.

The philosophy of medicine is not merely a "system" or dominating idea. Many systems have been tried and found wanting, because medicine is not an exact science but, like navigation and agriculture, it is an art, subject to conditions over which man has little or no control. Medicine can never become entirely and exclusively scientific.

There are those who affirm that medicine is undergoing a change from a practical art to an applied science. But surely that change can never become complete. Art and science both remain essential in medicine. Art is sense, science is reason; art asks "how?" and is concerned with treatment; science asks "why?" and is curious about causation.

The two points of view are apparent in the lives of Sydenham and Harvey; Sydenham, following the teaching of Hippocrates, writing admirable descriptions of diseases, insisting that "the art of medicine is to be properly learned only from its practice and exercise"; Harvey, curious to know why veins had valves, whence came all the blood pumped along by the heart, and whither it all went, pondering his solution of the problem for twelve years before putting it into print. Those two great men exemplify the extremes of art and science, each contributing to the progress of medicine.

Nevertheless a greater concentration on the art, as opposed to the science, of medicine, however desirable, does not supply the complete answer to our problem. The art of medicine is not its whole philosophy. One must search more deeply in history in order to construct a philosophy which will serve as a basis for modern medicine. Let us begin by glancing at the views current in ancient Greece.

SYSTEMS AND PHILOSOPHIES OF EARLY MEDICINE

Some of the early Greek philosophers practised medicine, and all were interested in the subject. There was Democritus, who was the first to state that all things were composed of infinitely small "atoms"; Alcmæon, who showed that the seat of intelligence was the brain and not the heart, as had been supposed; and Empedocles, who described the four elements, fire, air, earth, and water, and founded the doctrine of humours, which was the basis of medical practice for centuries.

It was Socrates who first humanised philosophy by applying it to man, rather than merely to the universe or the stars. Socrates, however, left no written records, and it is to Plato that we are indebted for a complete statement of his own views as well as those of his master. Unlike the greatest of scientific philosophers, Aristotle, who followed them, Socrates and Plato were not students of nature. They chose rather to examine the metaphysical world of pure logical concepts or ideas. Nevertheless Plato freely commented on the medicine of his time and laid stress upon the interdependence of soul and body. "The great error of the day," he writes, "is that the physicians separate the soul from the body." "The nature of the body can only be understood as a whole. To think of treating the eyes alone, without the head, or the head alone, without the rest of the body, is the height of folly." "Neither ought you to attempt to cure the body without curing the soul."

Of course the greatest of Greek physicians was Hippocrates, who did for medicine what Socrates did for philosophy. Not only did Hippocrates set medicine free from the domination of magic and from the control of the supernatural, but he speedily realised that so vast a subject must no longer be a mere branch of philosophy. He rendered great service by proving that no disease had a divine or sacred origin, but that all diseases arose from natural causes. Furthermore, he laid a solid foundation for therapeutics by teaching that "our natures are the physicians of our diseases." His case-records were careful and accurate; he laid great emphasis upon prognosis, and his ethical standard supplied a noble ideal which is followed to this day.

It was indeed strange that the teaching of the Hippocratic School became overshadowed 600 years later by that of Galen, and that the greatness of the Father of Medicine was not fully appreciated until after the Renaissance. Certainly his profound regard for the *vis medicatrix naturæ* was not shared by his immediate followers, who formed themselves into various sects, such as Dogmatists, Methodists, or Pneumatists, and so provided a problem for medical historians.

Among the Methodists, for example, was Asclepiades, one of the earliest Greek physicians to practise in Rome. He completely denied the healing power of nature and asserted that the physician must grapple actively with the disease and cure it "safely, swiftly, and smoothly." Such a physician, however dangerous in reality, is often highly popular and fashionable. "Masterly inactivity" is no easy doctrine when it comes to be applied in practice.

Hippocrates separated medicine from philosophy. Galen, in the second century A.D., strove to reunite them, but with little success. Galen's contribution to philosophy was slight. Yet his service to medicine was immense. He followed the teaching of Hippocrates, to whom he accorded full credit, and he made many discoveries of his own, which he described in his extensive

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writings. His views, including his errors, were accepted and blindly followed for more than a thousand years.

THE MEDIEVAL SCENE

After the time of Galen, medicine, and indeed all learning, entered a period of darkness and stagnation, when the quest for philosophy became a mere search for the philosopher's stone which would turn all to gold. Chemistry became alchemy, and astronomy degenerated into astrology, although it is true that there were some great physicians, such as Rhazes and Avicenna, among the Arabs of the Moslem Empire, and that the sciences of chemistry and pharmacology made some progress.

Moreover, it is easy to criticise astrology, but it may be a mistake to regard it as an entirely foolish science. In quite recent times it has been shown that the majority of distinguished men have been born in the early months of the year. There may be an optimum time for birth; in other words, some may be born "under a lucky star." Astrology, therefore, may contain some grain of truth, and medieval wisdom need not all turn to folly in the light of modern science. The influence of climate and weather, that is to say, of the sun and moon, upon the incidence of disease is still an interesting though somewhat neglected study. Furthermore, those Dark Ages may appear to us more dark than they really were, owing to the contrasting brilliance of the ages which preceded and which followed.

The torch of medical learning was not kept alight during those centuries by the Arabs alone. The Christian Church recognised the value of knowledge and, while it discouraged progress in medicine and forbade anatomical dissection, it preserved the learning of the ancients until the dawn of better times. In many a medieval monastery the work of transcription and translation was carried on; hence the classic Greek texts were preserved until, with the invention of printing, they became available for all. Another great service rendered by the Church was the care of the sick; the earliest hospitals were founded by Church leaders about this time. And now came an era of dramatic changes.

THE RENAISSANCE AND ITS RESULTS

The wonderful revival of learning known as the Renaissance, which marked the transition from the Middle Ages to the modern world, was no sudden revolution but rather a gradual movement—a dissatisfaction with the existing tradition and a receptive attitude towards new discoveries. Commencing in Italy as a renewed appreciation of art and literature, it permeated all branches of learning and gradually spread to other countries. The year 1543 was important for medicine and science, since it marked the appearance of the works of Copernicus and Vesalius, with their new and exciting discoveries in astronomy and in anatomy. Contemporary with Vesalius lived Ambroise Paré, that noble and humane surgeon, and Paracelsus who, notwithstanding his eccentricity, inaugurated a new epoch in medicine.

A golden age was indeed dawning, when scholars in various branches of learning coöperated with each other and showed a breadth of outlook which has never since been equalled. Medicine was profoundly affected by advances in other fields. Philosophers such as Francis Bacon and René Descartes showed how the search for knowledge ought to proceed, the former reviving the Platonic method of reasoning, the latter expounding the dual existence of body and soul. Galileo introduced mechanics, William Gilbert enunciated the principles of magnetism, while William Harvey completely revolutionised medicine by his discovery of the circulation.

Before this period surgeons and physicians had banded themselves together or separately into various guilds. In Edinburgh the barber surgeons and the surgeons received in 1505 from the Town Council a "seal of cause" to which royal assent was granted, and from this event arose the Royal College of Surgeons. A similar union, ratified by Henry VIII at London in 1540, led to the founding of the Royal College of Surgeons of England, although there were those who regretted the separation of surgery from medicine. As John Banester wrote at the time, "Some have affirmed that the surgeon hath not to deal in physic. Small courtesy it is to break faithful friendship, for one cannot work without the other, nor the other practise without the aid of both." This view was shared by Peter Lowe, when he founded the Faculty of Physicians *and* Surgeons of Glasgow in 1599.

CHEMICAL AND MECHANICAL VIEWS OF MEDICINE

It is not surprising that the eager race after new facts, which began at the Renaissance, led to the introduction of some curious trends. The desire to explain all vital processes in terms of physics and chemistry was favoured by two schools of thought, the iatrophysical and the iatrochemical. The former, like Descartes, regarded the human body as a machine; the latter looked on it as a test-tube in which chemical reactions took place.

Thomas Willis, the leading exponent of iatrochemistry in England, compared the physician to a brewer or vintner, watching the fermentations in the human body and prepared to rectify any irregularity. A strong supporter of iatrophysics was Archibald Pitcairne, whose name is linked with that of Alexander Monro as a founder of the Edinburgh School of Medicine, and who was one of the first to bring to Edinburgh the methods of the Leyden school. He boldly championed the views of Harvey at a time when much incredulity prevailed regarding the discovery of the circulation.

Although those two views were widely discussed, it soon became obvious, as it is again becoming obvious today, that there were certain aspects of health and disease which could not be explained in terms of physics and chemistry. Some further stimulus was required to free medicine from medieval scholasticism. The numerous new facts which had accumulated in bewildering profusion could not be built into the fabric of medicine after the fashion of the physical sciences. Medicine concerned the human body, and the human body was more than a machine.

At this stage there came upon the scene the dominant figure of Thomas Sydenham, who, like Boerhaave and Cullen in the following century, took a wide and humane view of medicine and advocated a return to the methods of Hippocrates. The attributes of a good doctor do not change; they remain the same for us as they were for Hippocrates and for Sydenham. Sydenham's views were not of the academic variety, but they were full of sound sense and deep human insight. Unlike his contemporary, Harvey, who was a Royalist, Sydenham was an officer in Cromwell's army. He lived in stormy times, and it is not surprising that the value of his writings was not fully appreciated until after his death. Nevertheless he was one of those men whose value cannot be assessed from the printed word. Personality, that elusive factor, counts for much. Perhaps the best of a man like Sydenham dies with him, as his friend John Locke pointed out. There is a knowledge which cannot be written down, though it may be passed down by example. Personal insight and human kindness cannot be transmitted by book learning. This explains why the old-fashioned system of apprenticeship was a most valuable part of medical education, unfortunately lacking today.

THE EIGHTEENTH-CENTURY OUTLOOK

As we proceed to survey the eighteenth-century scene, we find that, in spite of the Sydenham tradition and the sound teaching and example of such intellectual giants as Cullen, Mead, Fothergill, and Lettsom, the hankering

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after systems persisted, and here we encounter John Brown, with his "Brunonian" system, treating all diseases either by stimulants or sedatives in large doses, because, in his view, tension and relaxation were the only sources of every malady. At the opposite extreme in point of dosage was the method of Samuel Hahnemann, whose principle of homœopathy still exists. It represents perhaps the last effort to systematise medicine.

In those stately and spacious eighteenth-century days it was possible for a man of culture to have a fair knowledge of all the sciences. Fothergill had a botanical garden which rivalled the royal garden of Kew, and Mead had the best library and private art collection in London. The greatest surgeon of the century, John Hunter, built up a museum which was no mere collection. There was an object lesson in every specimen. Hunter founded the science of surgical pathology, but he also did much more, for he was keenly interested in all living creatures, from bees to elephants. His was that eager curiosity which characterises so many men of genius.

His oft-quoted remark, "Why think? why not try the experiment?" was made in a letter to his friend and pupil, the country doctor, Edward Jenner, with whose assistance he was investigating the body temperature of hibernating hedgehogs. Hunter explored the whole field of biology. He also strove to reunite medicine and surgery, which were developing along diverging lines.

Hunter's broad outlook is one which might well be revived today.

SCIENTIFIC AND EXPERIMENTAL MEDICINE

The nineteenth century found medicine still in quest of a philosophy, but the nature of the search had changed. It had become obvious that, to use the words of Claude Bernard, "Systems existed, not in nature, but only in men's minds." Bernard was not only a pioneer physiologist who made great discoveries; he was one of those who stepped aside from the path of research in order to guide others, by showing how investigation should be conducted. The true scientist studied the facts of nature, framed a hypothesis, and then, by experiment, tested the truth or fallacy of the hypothesis. Imagination had no place in the experiment. All facts, however unusual and curious, must be accepted. As Bernard was wont to say, "Imagination must be put on, like one's overcoat, on leaving the laboratory." Imagination was of service only in framing the hypothesis and in planning the experiments. Such was the philosophy of Claude Bernard. His *Introduction to the Study of Experimental Medicine* is a classic which should be read by every student.

SOCIALISATION OF MEDICINE

Bernard's work appeared in 1865 during a period of spectacular advance in medicine. It was the year of Lister's discovery, Pasteur was nearing the height of his career, and very soon the proof of a bacterial cause of many diseases was to alter the whole fabric of pathology.

Meanwhile the public conscience was awakening to the importance of health for all. Individualism was giving place to socialism; men like J. P. Frank on the Continent and Jeremy Bentham in England were stating that rulers were responsible for the health of their subjects, and that private philanthropy must now be replaced by public legislation in all matters concerning health and sickness. The socialisation of medicine was partly a result of the industrial revolution, the change from handicraft to machinery, from small workshops to huge factories; all of which so altered the mode of life of the people as to impose new and heavy responsibilities upon medical science. This new environment of medicine produced the National Insurance Act of 1911 and eventually the further proposals under consideration today. During the nineteenth century it had become more and more obvious that the general practitioner could not supply, single-handed, facilities for all the complicated laboratory tests and methods of treatment which were essential to modern scientific medicine. Nor could the average patient afford the expense associated with such progress.

Moreover, the treatment of the sick was only part of a vast programme of health legislation. No longer was medicine merely the curing of the sick and injured; the era of preventive medicine had arrived. Disease must be fought in its earliest stages, even before it had become disease. The promotion of health of body and mind by every possible means was desired, and this led to the development of what we now term social medicine. Today, the problem of maintaining the health of a nation, without too greatly interfering with the freedom of the patient or of his medical attendant, calls for great tact and statesmanship.

But a discussion of the future of medical practice does not come within the scope of the present subject. It is mentioned merely as indicating how the importance of the crowd is now tending to outweigh the importance of the individual, and each one must decide for himself whether this is a sign of progress or not.

DISADVANTAGES OF SPECIALISM

Reference must be made to another strong trend of modern medicine, the increase of specialisation. The inventions and discoveries of the past hundred years have given rise to many new branches of medicine. The specialist, absorbed in the study of his own particular portion of the human body or his own skilled technique, is in danger of losing touch with generalities, and of becoming an isolated unit.

As a result, medicine faces today the urgent need of unifying and integrating all this highly specialised knowledge. The word "integration" is not an elegant term, but it ought to be the slogan of modern medicine. No specialty should be allowed to develop as a detached entity.

Throughout a long history, medicine has been continually subjected to an alternation of separations and reunions. The present fragmentation of medicine has probably reached its climax, and soon it may be succeeded by a phase of reunion. The specialties may become rearranged in groups. In the field of neuropsychiatry this has already been accomplished, and other subjects may follow this example. Even medicine and surgery may again join forces, as many diseases have an interest in both.

Perhaps the medicine of the future may be taught as one vast subject, each specialist participating as his sphere of activity comes under discussion. In the meantime the isolation of the specialist should be avoided. If he cannot take a general postgraduate course every five years, the "quinquennial brain-dusting" advised by Osler, at least he should retain an interest in general medicine and general science, seeking out such generalities as still exist in these segmented times. Fortunately, modern science has accepted as a duty the task of translating new knowledge into language which the average citizen can understand, and such knowledge is in great demand. Nowadays everyone knows something about atomic energy and penicillin therapy. The specialist can no longer afford to be ignorant of the work of his colleagues, because even his patients may be already familiar with the latest discovery.

Of course extraneous knowledge and interests should be carefully controlled, and limited in time and place. The patient usually prefers a doctor whose mental activity is entirely medical, or at least appears to be so. One of Queen Victoria's doctors, Sir Henry Holland, in his autobiography, tells of a leading statesman of the time who was reproached by his friends for employing

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a doctor of very mediocre attainment. He replied that Dr. X was so ignorant of everything else that he could not be otherwise than profound in medicine. There may be some truth in such a remark; and yet, the physician's knowledge should surely extend beyond his physic. And it is not only desirable that the branches of medicine should be more closely linked together, and that medicine should continually learn from science. There might well be reciprocity with the arts and even with music, and a general interchange of knowledge and opinions.

THE UNKNOWN FACTOR

The arts and music, things of the spirit, remind us of that deep unfathomable human aspect of medicine which must be considered in any search for a philosophy. In an earlier part of this lecture it was mentioned that medicine could never become completely scientific. There enters into it an unknown and unknowable factor. As Sir Thomas Browne remarked, "There are many things true which are neither inducible by reason nor confirmable by sense." Perhaps this elusive but essential factor reaches its greatest height in medicine. Today philosophy, which has so greatly influenced the march of medicine, is undergoing vast changes, and many distinguished scientists are acknowledging that there is an indefinite "something" which lies beyond the reach of methods known to science. Scientists are becoming philosophers, and thus science and philosophy, which appeared to be drifting apart during the rapid scientific advance of last century, are again tending to come together, as in the days of ancient Greece. It is true that they are not yet entirely united. They do not completely understand each other. Perhaps medicine may act as the catalyst. Medicine, which so deeply concerns mankind, is both scientific and philosophic, and in the near future it may provide a meeting-place for other forms of knowledge, becoming the link between science and philosophy. Science and philosophy have each given much to medicine. It seems not unreasonable to expect that medicine will furnish to her benefactors, namely, to science and to philosophy, a common ground of understanding. Meantime, medicine might do well to cultivate broader interests and to study theory besides practice. Otherwise, in gaining the whole world, medicine may be in grave risk of losing its own soul.

PLACE OF HISTORY IN MEDICINE

A final important clue to the search for a philosophy has not been mentioned, although, in a sense, nothing else *has* been mentioned. It is the need for retrospection, for a closer study of that heritage of medicine which remains the only foundation for further progress. The trends and ideas which have influenced our forefathers are still at work today, although in a very different medium.

Yesterday's contribution cannot be neglected. It may be true that the medical student has no time to study history. Yet the greater the pace, the more the need for the backward glance. We may be running away from something more valuable than the thing we pursue. Perhaps we may learn this lesson in time, and perhaps before long there may be a department of the history of medicine in every university and school of medicine. It would not merely provide lectures but would be a centre for the promotion of all that pertains to the cultural aspect of medicine.

And if, as some would have us believe, medicine is about to enter a new and glorious era and to become the chief factor in promoting the welfare of mankind to an extent which we now discern but dimly, a study of the historical background appears to be essential. History may well furnish the chief source of inspiration and may even provide an answer to our quest for a philosophy.

PENICILLIN THERAPY

CLINICAL AND LABORATORY OBSERVATIONS ON FOUR HUNDRED CASES

R. VAUGHAN HUDSON, F.R.C.S., SURGEON.
R. I. MEANOCK, M.B. Lond., PENICILLIN REGISTRAR
MIDDLESEX HOSPITAL
JAMES MCINTOSH, M.D., LL.D. Aberd., DIRECTOR
F. R. SELBIE, M.A., M.D. Aberd., Ph.D. Lond., ASSISTANT PATHOLOGIST
BLAND-SUTTON INSTITUTE OF PATHOLOGY

IN March, 1943, one of the centres appointed by the Penicillin Clinical Trials Committee of the Medical Research Council was established at the Middlesex Hospital. This paper is based on several reports forwarded to the council over the last 2½ years. A combined clinical and laboratory research was planned with two policies in view, the first being the immediate necessity of preparing conclusive data to assist in the prophylaxis and treatment of battle and civilian casualties, and the second directed towards the methods of treatment and dosage of penicillin required for established infections in civilian life.

Of the 400 cases treated, 20 were severe injuries in which penicillin was used as a prophylactic agent and 380 were cases of acute or subacute established infections; 242 were treated with systemic penicillin, 46 with systemic and local penicillin, and 92 with local penicillin only. All cases have been followed up for a minimum period of six months, and the majority for more than a year. The conditions treated were as follows:

SURGICAL AND MEDICAL CASES TREATED

Systemic or Systemic and Local

	Cases		Cases
Carbuncles	18	Meningitis, streptococcal	1
Ditto with complications	17	Ditto meningococcal	1
Cellulitis	13	Acute peritonitis*	5
Adeno-cellulitis	10	Puerperal sepsis	2
Breast abscess	12	Actinomycosis	5
Acute primary osteomyelitis	21	Empyema†	13
Ditto with remote lesions	5	Pneumonia, pneumococcal	4
Acute recurrent osteomyelitis	5	Ditto staphylococcal	6
Subacute recurrent osteomyelitis	6	Ditto streptococcal	1
Vincent's angina	6	Ditto mixed flora	18
Acute pharyngitis	2	Ditto with effusion	1
Otitis media	18	Subacute bacterial endocarditis‡	18
Mastoiditis	9	Iritis, keratitis, syphilitic choroiditis	5
Ditto with complications	7	Hypopyon ulcer	1
Nasal sinusitis	4	Impetigo and erysipelas	4
Ditto with complications	5	Sycosis barbæ	7
Meningitis, pneumococcal	3	Secondarily infected skin lesions	15
		Gonorrhœa	17
		Periarteritis nodosa	1
		Thrombophlebitis migrans	1
		Subacute polyarthritis	1

Local only

	Cases		Cases
Conjunctivitis	7	Superficial wounds and ulcers	22
Empyema§	6	Streptococcal throat carriers	21
Breast abscess	11		
Sycosis barbæ	7		

* Streptococcal, staphylococcal, or gonococcal.
† Five complicated with tuberculosis or carcinoma. Staphylococcal 3, streptococcal 9, pneumococcal 1.
‡ *Streptococcus viridans.*
§ Two tuberculous; 1 secondary to carcinoma of bronchus.

Of the 288 cases treated with systemic penicillin, 188 were surgical and 100 medical infections. In the surgical group there were 8 failures and 11 deaths; in 162 an apparently complete recovery was obtained, while in 7 the acute lesion was reduced to that of a chronic infection. In the 100 medical cases there were 61 apparently complete recoveries, 11 deaths, and 15 failures; 13 recurrences were either not treated again with penicillin or failed to respond to a second course.

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LABORATORY FINDINGS

The bacteriological findings largely depended on the size of the dose and its duration (see table). When

ANALYSIS OF LABORATORY FINDINGS IN SURGICAL INFECTIONS TREATED WITH 60,000 UNITS AND 20,000 UNITS OF PENICILLIN INJECTED THREE-HOURLY DAY AND NIGHT

—	Dosage (units)	Cases	Time in days			
			0–3	*4–7*	*8–14*	*15+*
Time for disappearance of infecting organism	60,000	20	14	4	2	..
	20,000	19	4	8	4	3
			0–5	*6–10*	*11–20*	*20+*
Time for healing	60,000	14	6	5	2	1
	20,000	21	3	8	3	7
Time for disappearance of signs and symptoms	60,000	16	8	7	0	1
	20,000	24	3	8	8	5

20,000 units was given intramuscularly three-hourly in surgical infections organisms were often observed in the pus and always in the sloughs. With 60,000 units three-hourly the pus in the majority was reported free of organisms towards the conclusion of treatment, but in no case were sloughs sterilised. Where local penicillin was used in addition to systemic penicillin pus was repeatedly found to be sterile, but sloughs always contained organisms.

Where penicillin was used as a sole agent by instillation into breast cavities, pus again was often rendered sterile, but in spite of the fact that many thousand times the necessary concentration of penicillin was present in an abscess cavity sloughs always and pus sometimes still contained living organisms (Selbie et al. 1945).

Often with high dosage and treatment for eight to ten days the sputum of patients with pneumonia continued to harbour the causative organism in spite of the patient's well-being, absence of physical signs, and subsequent straightforward recovery.

In spite of a three-hourly dose of 60,000 units and twenty-one days' treatment, *Streptococcus viridans* has been recovered from extracted teeth. In sycosis barbæ strains of *Staphylococcus aureus* isolated after recurrence following both local and systemic therapy have been found to be more resistant to penicillin than those isolated before treatment.

CLINICAL OBSERVATIONS

From the outset our policy has been to treat infections due to penicillin-sensitive organisms without regard to the character of the tissue principally affected. We have, therefore, had an opportunity of analysing the basic factors underlying successful penicillin therapy and thus of establishing an orderly plan of treatment.

It became evident that irrespective of the site of infection penicillin administered by the systemic route abruptly halted the rising tide of infection and caused it to ebb towards the focal site. In one to two days there was relief of pain and symptoms, disappearance of organisms from the blood-stream, and a striking decline in fever. The first stage of the clinical battle was over, and its consistent success and rapidity of progress depended on the size of the dose. The second stage was now entered on, in which the host must be helped to destroy the organisms enmeshed in the focal infected avascular tissue. The final success of this stage depended on the duration of treatment and the management of infected avascular tissue and pus. If the treatment was too short the acute infection recurred, and the time before a recurrence appeared seemed to be proportionate to the degree of under-dosage, so that organisms emerged from their hide-out in this stubborn infected residual tissue as early as the fifth and as late as the fifty-fifth day. A second and adequate course of penicillin proved successful in these cases.

Throughout treatment the need to assist the host to destroy the infecting organisms completely had to be kept to the forefront of the mind, no matter whether the organisms lay in epithelial or endothelial traps, fibrous tissue, or bone.

The patient's well-being, the early disappearance of signs and symptoms usually about the sixth or seventh day, the rapid healing of surgical incisions, and the discomfort of the parenteral administration of penicillin all combined to tempt the clinician to discontinue treatment too soon.

In the management of infected avascular tissue inappropriate for or out of reach of the surgeon's knife, treatment had of necessity to be prolonged. Where infected tissue spontaneously extruded itself, or could be removed by the surgeon's knife, treatment could be considerably shortened, but where tissue-harbouring organisms could not be totally removed spontaneously or by the surgeon it was essential to continue treatment for a time, depending on the amount of residual infected tissue remaining. The site and character of the tissue involved proved a more important factor than the resistance of the organism.

Both surgeon and sufferer needed considerable patience in the protracted treatment necessary for inaccessible lesions, and at other sites where time must be allowed for the response of the host to develop and demonstrate to the surgeon where pus and infected material could be removed with least injury to tissue and greatest benefit to the patient. This patience paid a fine dividend. In most surgical cases a "cold abscess" formed which when it pointed was best dealt with by a ¼-inch incision and a temporary drain, for this made it possible for loose sloughs and fibrin which were too large to pass through the lumen of a needle to be removed, with rapid relief of discomfort and toxæmia. Aspiration with the local instillation of penicillin proved protracted and painful and in most cases inefficient, probably because the cavity failed to collapse. If the site of the abscess or dead tissue threatened a closed tract or cavity (meninges, pleura, &c.), a more generous incision was necessary for the evacuation of pus and the removal of all visible infected tissue. Satisfactory results were obtained by primary suture and temporary drainage in these cases. Long incisions without the removal of all infected dead tissue, whether sutured with drainage or left open, gave the worst results and caused delay in healing.

In traumatic surgery the adequate and deliberate removal of avascular tissue was conducted simultaneously with penicillin therapy. In all established infections penicillin was given the opportunity of converting an acute lesion into a chronic lesion before surgery was employed, so that the risk of dissemination was obviated. In some cases it was only possible to convert the acute into a chronic lesion, and after a few weeks' interval, when the chronic lesion was well demarcated and the patient's general condition had considerably improved, he was readmitted for the deliberate removal of the remaining dead tissue under cover of a second course of penicillin, the wound being sutured with temporary drainage. In the few cases where surgical intervention was necessary the covering course of penicillin effectively prevented dissemination of infection.

The value of local penicillin was found to be limited by the character of the wall and the surface of the wound or cavity, and in consequence the most satisfactory results were obtained where the organism lay close to the surface or in an effusion as opposed to pus.

It was noteworthy that avascular but uninfected tissue had a remarkable power of recovery and that infected avascular tissue could ultimately be absorbed or remodelled into the architecture of its surroundings. The inevitable trauma inflicted by surgery delayed tissue repair and increased the amount of tissue work needed.

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By limiting surgery to the minimum and closing the skin a maximum amount of tissue was preserved, with quick healing, rapid restoration of function, and little risk of secondary infection.

Pus was not always easy to find when insidiously converted by penicillin into a relatively painless "cold abscess." It was suspected and diligently sought for when toxæmia persisted. The removal of pus by adequate drainage was strikingly beneficial.

Provided the cause of the infection was a penicillin-sensitive organism the secondary penicillin-resistant contaminants tended to disappear. If the primary infection, however, was caused by a penicillin-resistant organism, and penicillin-sensitive organisms gained entry as secondary contaminants, the control of these sensitive organisms improved the patient's general condition, but they were apt to reinvade the host on cessation of therapy if the penicillin-resistant primary infection did not respond to other treatment. There appears, therefore, to be a definite place for therapy directed against both sensitive and insensitive organisms in some infections.

Where an underlying lesion—such as malignant disease, tuberculosis, leukæmia, or certain skin conditions—invited reinfection with sensitive pyogenic organisms, the patient's health could be much improved by the control of these organisms. Used in this way, therefore, penicillin assisted in the relief and recovery of some patients with such lesions, although the high proportion of failures in such cases tend to produce statistically an unfavourable impression of penicillin therapy.

Although penicillin itself is considered to be non-toxic, in a very small proportion of cases a reaction during treatment, or after treatment had ceased, was noticed. This varied from an intense angioneurotic œdema to minor skin rashes in 6% of all cases treated.

Many patients had a persistent pyrexia during therapy in spite of obvious clinical improvement, but the temperature rapidly dropped to normal on the completion of the course of penicillin therapy, and was not regarded as an indication for premature cessation of treatment.

The relatively sudden improvement in general well-being seen in most patients forty-eight hours after the withdrawal of penicillin was a definite feature of successful therapy. The reason for this is still conjectural.

The policy of suspecting pulmonary and osseous lesions to be associated proved valuable in diagnosis. In 5 cases of severe and unaccountable septicæmia recovery under treatment revealed that the concealed and feeding focus lay in bone. In pulmonary lesions radiography was of the utmost value in diagnosis, but owing to the "lag period" the radiological findings were fallacious in the diagnosis of osseous lesions, and in convalescence they portrayed a past event which was not necessarily related to the patient's present condition.

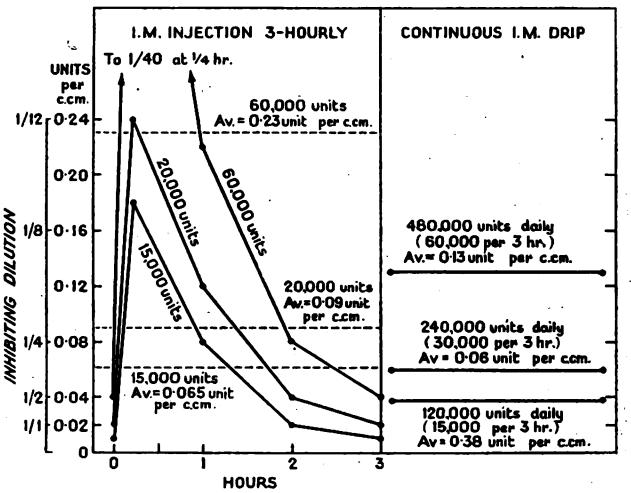
The incalculable factor of the host's natural power to overcome infection proved the key to the baffling problem of dosage and the apparent contradictions in results, and it explains why in apparently parallel cases one patient will need more assistance from penicillin than another; in drawing up a scale of dosage the aim should therefore be to assist the greatest number and render failure an exception. For a second course of treatment is disheartening and time-consuming for both patient and clinician.

ADMINISTRATION OF PENICILLIN

Penicillin serum levels are a more certain index of effective therapy than dosage, and this is an important consideration in the evaluation of clinical results. Renal insufficiency conserves penicillin and raises the serum level, and there is also a "personal factor" which enables a small proportion of patients to maintain a higher level than the average on the same dosage.

The present necessity for parenteral administration is the greatest objection to penicillin and a common reason for under-dosage.

The intermittent method of intramuscular administration produced a much higher average serum level than the continuous method, for the same amount of penicillin (see figure). With continuous intramuscular administration the serum level is remarkably constant for the dose administered. It has not been possible to decide whether the continuous or the intermittent method gives the best therapeutic results. The figure shows that with



Average blood-levels of penicillin during intermittent and continuous intramuscular administration. The inhibiting dilution of the blood was determined by finding the highest twofold dilution of the serum inhibiting the growth of the Oxford staphylococcus (Selbie, Simon, and McIntosh 1945). Each of the blood-levels shown during intermittent administration represents the average of estimations on 20 different patients for doses of 60,000 and 20,000 units and on 5 patients for 15,000 units. The overall average for each dosage level has been calculated by measuring the area enclosed by the curve and converting this area into a rectangle. The average blood-levels during continuous administration are based on five to ten estimations on each of 4 patients receiving 120,000 units daily and on 2 patients for each of the other two dosage levels.

intermittent therapy there is a supplementary peak of penicillin above the constant average titre; this may be of therapeutic value and may assist penetration of the penicillin into avascular tissue.

Up to the present, intermittent therapy has given us very constant results and has in most cases been best suited to patients and staff. Many thousands of injections have been given without mishap or a single case of infection. Continuous intramuscular therapy has been the most suitable method for patients immobilised by their disease or injury; it is unsuitable for restless or active patients.

DOSAGE

Some cases were successfully treated with as low a dose as 5000 units three-hourly by intramuscular injection over a long period. It was, however, only with doses of 20,000 units, producing an average blood-level of 0·09 unit per c.cm., that results became consistent. The results in a series of cases of every type of infection treated with 20,000 units three-hourly were compared with those in a parallel series in which the dose had been raised to 60,000 units three-hourly, producing an average blood-level of 0·23 unit per c.cm. With this increased dose the patient's stay in hospital was shortened, owing to the more rapid control of infection, the increased rate of healing, and the greater preservation of tissue (see table). The duration of treatment largely depended on the site of the infection, and the average minimum duration of treatment at the 60,000 level was broadly as follows.

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DURATION OF TREATMENT

Condition treated	*Days*
Uncomplicated gonorrhœa	1
Vincent's angina	2
Erysipelas, impetigo	3
Carbuncles, cellulitis, and adeno-cellulitis	5
Breast abscesses	7
Otitis media and mastoiditis	8–10
Sinusitis, pulmonary lesions, and meningitis	10–12
Bacterial endocarditis	21–28

One possible exception to the 60,000 unit optimal dose is uncomplicated gonorrhœa, where 30,000 units two-hourly for five doses, as suggested by Lloyd-Jones and his colleagues (1945), proved successful. In boils, carbuncles, and purely cutaneous lesions a three-hourly dose of 20,000 units appeared to give as good results as 60,000 units. Some types of infection are not included in this broad scheme of dosage. In actinomycosis 60,000 units three-hourly for twenty-one days provided the only apparent cure and this in an early case of the cervical type. Similar doses and shortened duration of treatment, or this same dose, failed in the remaining 5 cases.

Subacute bacterial endocarditis provided the greatest exercise in determining the size of the dose and duration of treatment. Only a small proportion of our penicillin could be spared for this purpose and on a dosage of 20,000 units three-hourly all of our first 5 patients died. When a special grant of penicillin became available we were able to increase the dose to 60,000 units, and with this dose and twenty-one days' treatment 6 of 9 cases were apparently cured, with two relapses. By a further increase in the duration of treatment to twenty-eight days these two relapsed cases were "cured," and so far there have been no relapses in the 6 cases subsequently treated with 60,000 units three-hourly for twenty-eight days (Ward et al. 1946).

The three-hourly dosage of 20,000 units, and even 60,000 units given for as long as twenty-one days, failed to cure 5 cases of subacute exacerbation of intra-ocular chronic infection and 10 of 15 secondarily infected lesions of the skin.

In osteomyelitis a three-hourly dose of 60,000 units was found to be superior to 20,000 units, but in spite of the favourable results we do not think that the ten to twelve days' course will prove to have established a permanent cure in most of our cases.

In surface lesions of the buccopharynx, lozenges or tablets, as originally advised by MacGregor and Long (1944), with an average content of 500 units were dissolved slowly in the mouth every two hours, and an aqueous solution of 500 units to the c.cm. was sprayed into the nose and pharynx, three times daily.

For application in powder form penicillin was mixed with sulphathiazole to give a concentration of 500 or 1000 units of penicillin per gramme. For surface lesions creams containing 1000 units per g. in a fatty base have been employed, but we are still not satisfied that a suitable vehicle has been found for the slow and adequate release of penicillin.

Penicillin in solution was introduced into wounds and empyemas in doses of 60,000 units with a dilution proportionate to the size of the cavity, avoiding too high a concentration.

In meningitis the intrathecal dose employed was 10,000 units daily, in a concentration where possible not greater than 2000 units per c.cm.

TECHNIQUE OF INTRAMUSCULAR INJECTION

Care has to be taken in the preparation and administration of penicillin to avoid contamination with penicillin-resistant organisms. Needles and syringes are sterilised either by boiling or in an autoclave, and are used solely for penicillin administration. No syringe is ever used for both aspiration and administration. The needles should be of stainless steel and the one in common use is size 6 or 7 (Firth's).

The appropriate dose is selected and diluted with the minimum amount of fluid necessary, averaging 3 c.cm., to which 1% procaine has been added. Injections are made into the buttock between the crest of the ileum and the sciatic notch, well above the emergence of the sciatic nerve. The discomfort of the injection is considerably mitigated by the training and natural skill of the nurse giving the injection. A soporific at night, of which we have found 'Sodium Amytal,' gr. 3, of great value, assists in controlling the wakefulness induced by the injection.

For continuous intramuscular therapy, the ingenious apparatus called Eudrip 3, originally devised by Christie and his co-workers and developed by Learmonth and others (McAdam et al. 1944) has proved most satisfactory.

CONCLUSIONS

Four hundred medical and surgical cases have been treated with penicillin and followed up for an average period of a year. With systemic therapy 223 patients have recovered, in 23 the treatment failed, and 22 patients died; in a further 7 the acute infection became a chronic lesion.

In all of the 20 cases of complicated compound fractures and multiple injuries, in which prophylactic systemic penicillin was given, primary union was achieved and maintained.

The deaths were due to the severe complications present at the outset of treatment, or to under-dosage. Deaths from the former cause may be reduced by early diagnosis and early treatment, and from the latter by increased knowledge of the principles of penicillin therapy.

Actinomycosis and persistent infections of the deeper tissues of the eye have proved most resistant to treatment. An underlying lesion, such as carcinoma, tuberculosis, or established disease of the skin, has been responsible for the majority of our recurrent infections.

In systemic therapy a dose of 60,000 units injected intramuscularly every three hours day and night was found to be the most satisfactory. The duration of treatment varied from one day to twenty-eight days and depended on the individual case and the necessity for destruction of the organism in the remaining avascular tissue.

In traumatic surgery the extirpation of avascular tissue was an essential concomitant to penicillin therapy. In established infections, of the several methods tested, two proved satisfactory. When penicillin had converted the acute lesion to a chronic one a small incision and temporary drainage was all that was necessary or advisable in the majority of cases, but in a minority and for specific reasons the radical removal of all visible infected material followed by primary suture and temporary drainage gave uniformly satisfactory results. Whichever method was employed it was essential to continue penicillin for a time long enough to control the residual infected tissue.

Local administration was valuable in surface lesions; with local therapy 61 cases were cured and 23 failed. In all other infective lesions systemic therapy proved the most satisfactory method, and, with the exception of meningitis and possibly empyema, supplementary local penicillin therapy was unnecessary.

Penicillin therapy has been a particular advance in the control of infections with *Staphylococcus aureus*, *Streptococcus viridans*, and the sulphonamide-resistant gonococcus.

The successes obtained have been due to maintaining a concentration in the tissues of sufficient strength and for sufficient time to enable the patient to utilise his

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natural defences to the full. An apparent cure has been obtained where the patient has been able to localise his infection so that he can absorb necrotic tissue, spontaneously extrude pus or dead tissue, or provide safe conditions for the surgeon to assist recovery by removing dead tissue.

Patients and clinicians owe a great debt to the discovery of Fleming and the work of Florey and his collaborators.

We are indebted to the Medical Research Council for the supply of penicillin and a grant towards the cost of the investigation; to Dr. T. Parkes, Dr. C. Paine, and Dr. J. W. Stewart, the penicillin registrars, who have contributed so much active work in the treatment and management of the cases; to many of our colleagues for their coöperation and permission to participate in the treatment of their cases—in medical lesions to Dr. R. A. Young, Dr. G. E. Ward, Dr. G. E. Beaumont, Dr. Izod Bennett, Dr. K. Ball, and Dr. J. Beck; in lesions of the eye to Mr. Affleck Greeves; in lesions of the skin to Dr. H. MacCormac; in lesions of the ear, nose, and throat to Mr. C. P. Wilson; in neurological cases to Dr. P. H. Sandifer and Mr. T. G. I. James; and in odontological cases to Mr. J. W. Schofield. We are also indebted to Prof. B. W. Windeyer, Mr. D. H. Patey, Mr. G. Monro, and Mr. D. Ranger, and to Prof. E. C. Dodds and his staff in the Courtauld Institute of Biochemistry. Our thanks are also due for many courtesies to Dr. J. Trevan of the Wellcome Research Laboratories.

REFERENCES

Lloyd-Jones, T. R., Maitland, F. G., Allen, S. J. (1945) *Lancet*, i, 368.
McAdam, I. W. J., Duguid, J. P., Challinor, S. W. (1944) *Ibid*, ii, 336.
MacGregor, A. B., Long, D. A. (1944) *Brit. med. J.* ii, 686.
Selbie, F. R., Simon, R. D., McIntosh, J. (1945) *J. Path. Bact.* **57**, 47.
Ward, G. E. S., Meanock, I. R., Selbie, F. R., Simon, R. D. (1946) *Brit. med. J.* in the press.

PARALYTIC ILEUS IN SEVERE HYPOTHYROIDISM

P. A. BASTENIE
M.D. Brussels
From the Medical Clinic, Hôpital St. Pierre, University of Brussels

THE classical description of the myxœdema syndrome includes obstinate constipation, often associated with meteorism. Means (1937) found these symptoms in 61% of his cases. Escamilla et al. (1935) and others have described cases of myxœdema in which abdominal distension was a presenting sign. Friedenwald and Morrison (1933) indicated that hypothyroidism might lead to obstinate constipation only curable by thyroid extract. In infants megacolon and an "intestinal type of hypothyroidism" have been described by Ribadeau-Dumas and by Pehu.

Nevertheless, the possible importance and severity of the intestinal signs and symptoms in myxœdema do not appear to have been sufficiently emphasised. In my experience ballooning of the abdomen by flatulent distension of the intestines may constitute an important diagnostic point in patients with unrecognised hypothyroidism, where all the other signs of the disease are minimal. On the other hand, some of my cases have shown that megacolon may develop in the course of a severe thyroid deficiency and may give rise to a true paralytic ileus, of which it is essential to recognise the exact ætiology if disastrous surgical intervention is to be avoided.

It may seem surprising that such an important aspect of the disease has not previously been more widely recognised. But since the discovery of specific thyroid therapy for myxœdema (which was introduced some 20 years after the recognition of the disease), the opportunity of studying the evolution of myxœdema has almost disappeared. The chance I have had within a few years of observing 29 cases of frank myxœdema, 10 of which were extremely severe and in which post-mortem examination was made, may well be regarded as exceptional. On the other hand, as far as I know, no author has systematically studied the "preclinical" lesions which, before the appearance of myxœdema, lead on to the destruction of the parenchyma and to the fibrous atrophy which is responsible for the thyroid deficiency in the great majority of cases. Thus it has been the investigation of preclinical "involutional thyroidosis" (Bastenie 1945) which has made it possible to study certain aspects of early myxœdema and to attribute certain intestinal symptoms to a latent thyroid insufficiency. In this study I shall describe first a series of cases of frank myxœdema in which severe intestinal symptoms have supervened. A second series of observations will show the occurrence of intestinal paresis in patients without obvious signs of hypothyroidism and in whom the paresis represents the principal if not the only symptom of associated hypothyroidism.

INTESTINAL PARESIS AND PARALYTIC ILEUS IN THE COURSE OF MYXŒDEMA

Of 29 cases of myxœdema, 19 have shown significant intestinal signs—i.e., persistent constipation, intestinal distension, tympanism, and considerable increase in tension of the abdominal wall. Ten of the cases which were of greater severity and more prolonged duration, with a basal metabolism of −30 to −50%, showed these intestinal upsets in 7 instances, 3 of them having partial obstruction.

In 4 cases of severe hypothyroidism secondary to destruction of the pituitary I have also seen 1 case of severe intestinal paresis. The following case-records illustrate these phenomena, which appear to be much accentuated by the gravity and duration of the disease.

CASE-RECORDS

CASE 1.—A woman, aged 58, had been apathetic, obese, and bald for 5 years and had been operated on 15 years previously for appendicitis. For 8 days her chronic constipation had been unrelieved, and her abdomen had become distended and protuberant. She was referred to hospital with a diagnosis of intestinal obstruction. She showed the signs of frank myxœdema, with the basal metabolism lowered to −37%. The abdomen was enormous (fig. 1) and very tympanitic. The patient did not vomit but had no spontaneous bowel action. Wash-outs were without result, as were also injections of cascara and thyroxine. She roused for a short while from her torpor but died shortly afterwards. A provisional diagnosis was made of "myxœdema; intestinal obstruction probably due to postoperative adhesions; infected bedsores." Autopsy showed an extreme degree of sclerotic atrophy of the thyroid and hyperplasia of the anterior pituitary (characteristic of thyroid deficiency), a great distension of the colon, which was considerably elongated, and the absence of adhesions.

CASE 2.—A very obese woman, aged 81, was admitted to hospital with a fracture of the heel. She had a well-marked hypothyroid condition. For 3 months she had noted a considerable increase in her girth. On examination the abdomen was enormous and the abdominal wall under considerable tension (fig. 2). In spite of intensive treatment with thyroxine the general condition of the patient deteriorated rapidly. Abdominal meteorism became extreme; wash-outs produced only a few small stools. Autopsy showed, besides the typical changes in the thyroid and pituitary, a gigantic hypertrophy of the colon, which was 330 cm. long and approximately 25 cm. in diameter. The wall was much thickened and the consistence resembled that of soft leather.

CASE 3.—A woman, aged 65, an old diabetic whose diabetic symptoms had recently remitted and in whom the menopause had occurred at the age of 52, had had attacks of dizziness for 5 years, progressive deafness, much loss of hair, increasingly obstinate constipation, and abdominal distension, which had become very noticeable during the past year. A little ascitic fluid was removed which showed a low protein content (11·8 g. per 100 c.cm.). In view of the degree of abdominal distension the first diagnosis considered was that of an abdominal tumour. But in view of the subjective signs, the depilation of the eyebrows, the expressionless facies,

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the slow and raucous speech, and the great dilatation of the colon, revealed by radiography, the intestinal symptoms were attributed to hypothyroidism. This diagnosis was confirmed by estimation of the basal metabolism, which was −46%.

The patient died of bronchopneumonia. Again the autopsy, besides the characteristic lesions of the thyroid (complete atrophy) and of the pituitary (hyperplasia due to increase of the chromophobe cells), showed an enormous distension and elongation of the large intestine. Microscopically, the wall showed myxœdematous infiltration of the stroma, considerable atrophy of the mucosa, and a diffuse infiltration of the submucosa by lymphocytes and plasma cells. The glandular crypts were diminished, but some of them showed hyperplasia and cystic distension (fig. 3).

INTESTINAL PARESIS APPEARING BEFORE THE OTHER SIGNS OF MYXŒDEMA

CASE 4.—A woman, aged 65, first seen in the medical clinic in 1935. The menopause had occurred at the age of 53. She had had attacks of dizziness for 2 years, depression, pains in the lower limbs, anorexia, constipation, and distension after meals. These digestive disturbances had led to considerable wasting. On examination the patient was of short stature, and the facies pale, slightly bloated; tongue red and shiny, like that seen in pernicious anæmia. Pulse regular, rate 84 per min. Blood-pressure 140/70. In view of the abdominal distension and the tympanites, the possibility of abdominal neoplasm was considered. Proctoscopy was negative. Gastric analysis after the injection of histamine showed considerable hypochlorhydria. There was moderate anæmia: red cells 4,000,000 per c.mm., white cells 5000 per c.mm., Hb 80%, colour-index 1. Van den Bergh reaction was direct delayed 1. Radiography showed the stomach hypotonic, without any organic lesion, and great gaseous distension of the colon. Under symptomatic treatment the patient's general condition improved, the bowels became more regular, and she left the hospital with the diagnosis of "intestinal flatulence, secondary to hypochlorhydria."

In 1940 she returned to the hospital with diffuse pains in the arms and legs, general weakness, and swelling of the hands, feet, and abdomen. She said her appetite was good, but that she continually had severe constipation. On examination there was well-marked hypertension, although the electrocardiogram showed a diminution in voltage. The distended abdomen increased still further in volume while she was in hospital. No tumour was palpable, and no ascites was found. Vaginal and rectal examinations were negative. Radiography showed an enormous dolichomegacolon; the injection of 3 litres of barium did not reach the splenic flexure. The patient meanwhile became increasingly somnolent, and the blood-pressure fell. The diagnosis of myxœdema was confirmed by estimation of the basal metabolism, which was −25%. After intravenous injections of thyroxine, the voltage of the electrocardiogram was increased, the infiltration of the tissues disappeared, the blood-pressure rose to 180/100, the abdominal meteorism diminished, and constipation was relieved. Further radiography to exclude a neoplasm gave a negative result as before.

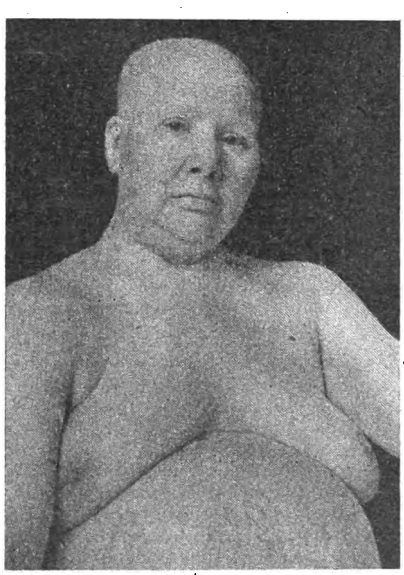

Fig. 1—Abdominal enlargement and myxœdema (case 1).

It is clear that the diagnosis of myxœdema, which was made in this case in 1940, was based on indisputable evidence. But in retrospect, we may say that the first symptoms were appearing in 1935, and of these the digestive disturbances were the presenting ones.

CASE 5.—A woman, aged 52, in whom the menopause had occurred 3 years previously and who had since had two strokes, was sent to hospital because her practitioner suspected a cyst or tumour owing to the considerable and rapid increase in the size of the abdomen. On examination the patient, who had generalised obesity and weighed 101 kg., had an enormous abdomen, which was tympanitic and contained neither ascites nor tumour. The blood-pressure was 160/80, and the pulse-rate 80 per min. There was a generalised but moderate puffiness. The body hair was diminished and urinary output reduced. The temperature was normal. Urine examination was negative. The blood-urea was 34 mg. per 100 c.cm. The patient left the hospital having been advised to adopt a restricted diet and to carry out thyroid treatment.

Two years later she was readmitted to a surgical ward owing to a recurrence of the same signs. An exploratory laparotomy was carried out, at which neither cyst nor tumour was found; this was followed by bronchopneumonia and death. Autopsy showed well-marked adiposity, peritonitis, cardiac hypertrophy and dilatation, and bronchopneumonia. The colon was greatly distended, its wall thickened and whitish. The thyroid weighed 25 g., but microscopy showed widespread and advanced lesions of "involutional thyroidosis." The pituitary was considerably enlarged, owing to increase of hypertrophied chromophobe cells.

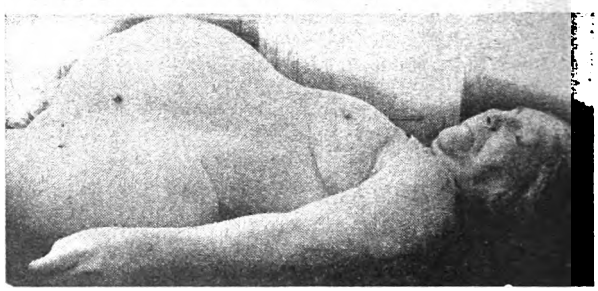

Fig. 2—Abdominal enlargement and myxœdema (case 2).

These last two pathological findings confirm the diagnosis of hypothyroidism, of which the former lesion was the cause and the latter the result. The flatulent distension of the abdomen, together with the adiposity, was the sole clinical sign of this condition.

CASE 6.—A woman, aged 64, was referred to the medical service on April 18, 1937, for "cardiorenal disease." On admission she showed absence of secondary sexual characters, gross obesity, and obvious signs of cardiac failure. The respiration-rate was 32 and the pulse-rate 100 per min. The blood-pressure was reduced. Prof. P. Govaerts, who was struck by her haggard appearance, the diffuse infiltration of the tissues, the absence of tendon and cutaneous reflexes, and the almost complete absence of eyebrows and pubic hair, diagnosed "obesity, cardiac dilatation, upper respiratory-tract infection, and possible myxœdema." The Bordet-Wassermann reaction was negative; blood-urea 65 mg. per 100 c.cm.; urine normal. Urinary output was reduced (400 c.cm.). Radiography confirmed the presence of cardiac dilatation.

Five days after admission, bronchitis developed, the patient became very dyspnœic, and the temperature rose to 100·4° F. The abdomen became considerably distended.

Next day abdominal meteorism became still more marked and physical signs of partial obstruction appeared. Although the patient had not passed a stool for several days, a wash-out produced only a few scybala. There was no vomiting. Contrast radiography showed distension of the small intestine and colon, with loculi of fluid. A barium enema showed some difficulty in negotiating the sigmoid. A diagnosis of intestinal obstruction was made and the patient transferred to the surgical service, where a laparotomy revealed only flatulent distension of the intestine. Death took place soon afterwards.

The autopsy furnished the following diagnosis: obesity, cardiac hypertrophy and dilatation, atrophic sclerosis of the thyroid (8 g.), dilatation of the small intestine and colon,

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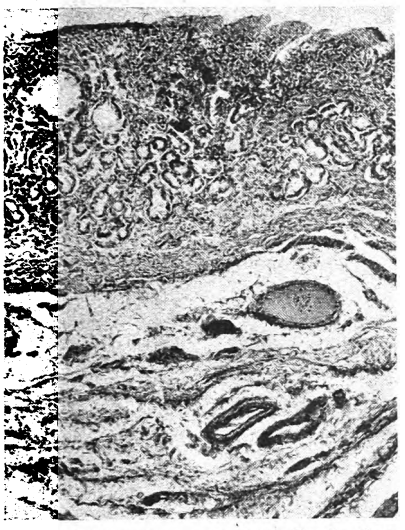

Fig. 3—Photomicrograph of wall of colon, showing myxœdematous infiltration of stroma, atrophy of mucosa, diffuse infiltration of submucosa by lymphocytes and plasma cells, and glandular crypts mostly diminished but some showing hyperplasia and cystic distension (case 3).

bronchopneumonia of the right base, and biliary lithiasis.

CASE 7.—A woman, aged 70, who had had a transient stroke a month previously, was admitted with moderately severe signs of myocardial insufficiency. She had well-marked arteriosclerosis and a blood-pressure of 230/170. The urine contained no sugar or albumin. The blood-urea was 28 mg. per 100 c.cm. The heart was increased in size and was lifted up by the distension of the colon. This, together with obstinate constipation, was associated with intense abdominal distension. Since investigations showed no evidence of an organic obstruction of the intestine and the patient remained somnolent, the possibility of paralytic ileus due to thyroid insufficiency was considered. Nevertheless, the patient was emaciated, and there was no other sign of myxœdema. Unfortunately death took place before the appropriate investigations could be completed.

Autopsy showed arteriosclerosis, hypertrophy of the myocardium, and great distension of the colon. The suprarenal cortex was thickened, rich in lipoids, and adenomatous. The thyroid, which was slightly diminished in size, showed great reduction of the parenchyma, which was altered almost throughout and infiltrated with dense sclero-inflammatory tissue. The pituitary showed considerable hyperplasia, with increase of large chromophobe cells.

DISCUSSION

The above case-records are typical examples of the severe intestinal upsets which may arise in the course of obvious or latent hypothyroidism. They make it possible to outline a clinical and pathological picture and provide some indication for diagnosis and treatment.

Clinical Picture.—Intestinal paresis developing in hypothyroidism may be chronic or acute. The chronic paresis is found in hypothyroidism of long duration, and the clinical picture is characterised by increasingly severe constipation and progressive distension of the whole abdomen. The distension may be as large as that seen in peritonitis or intestinal obstruction. In several of my cases it was of such extreme discomfort to the patient and dominated the clinical picture to such an extent that, in spite of other signs of hypothyroidism, it became the main preoccupation of both the patient and the clinician. In such cases intestinal paresis gradually becomes established, spontaneous defæcation is absent for a week or more, flatus is rarely passed, and wash-outs produce only a few scybala. The abdominal wall becomes extremely distended. Radiography shows gross flatulent distension of the intestine, sometimes with loculi of fluid. No organic obstruction is found on examination, even by radiography, though the latter often shows a dolichomega-colon. In one case 3 litres of barium were necessary to fill the ascending colon as far as the splenic flexure. At this stage the patient, who has reached the last stages of myxœdema, succumbs to an intercurrent infection or passes into coma, to which the toxic effects of the intestinal stasis probably contribute.

In other cases the abdomen enlarges so rapidly that the physician is likely to suspect a cyst or tumour. Or again, the distension may follow a bronchopneumonia (case 6), but far from remaining a trivial symptom it assumes enormous proportions and is associated with extreme tension of the abdominal wall. Contrast radiography in such cases shows flatulent distension of both the small and the large intestines. Paralytic ileus may be acute and alarming; in cases 5 and 6 it was considered that the only prospect of relief lay in surgical intervention.

Pathology.—It is surprising that not only have the clinical aspects of intestinal dysfunction in myxœdema been relatively neglected but also the pathology of the intestine in this disease has received little attention. Wegelin (1926) and others have remarked on the distension of the stomach and intestine, particularly the small bowel, in cretins, and Ceelen (1921) has described a significant dilatation of the colon, with chronic inflammatory infiltration of the submucosa, in acquired hypothyroidism.

In the first 5 autopsies I have carried out on severe acquired myxœdema I have consistently found an enormous distension and elongation of the colon, which in 1 instance attained a length of 330 cm. (The last 5 autopsies were not carried out by me, and the lesions were not investigated.) The wall of the colon was thickened and somewhat whitish, had lost all elasticity, and was of the consistence of soft leather. Microscopy showed lesions which correspond to those described by Ceelen and are characterised by a myxœdematous infiltration of the stroma, atrophy of the mucosa, diffuse infiltration of the whole of the submucosa by lymphocytes and plasma cells, and diminution of the glandular crypts, with in some instances hypertrophy and cystic distension.

Physiopathological Mechanism.—Ceelen (1921) and subsequently Wegelin (1926) considered that it was the slow peristalsis which led to the progressive distension of the abdomen. The lesions just considered, which show the deposition of myxœdematous material separating the muscular fibres from the ganglia of Auerbach's plexus, explain the loss of elasticity and the paralysis of the intestine. Further, the atrophy of the mucosa of the colon is accompanied by a similar atrophy of the gastric mucosa and by hypochlorhydria, and, although I have not verified this, it seems probable that the mucosa of the small intestine is also affected. The diminution of peristalsis and the liability for the intestine to become distended with the products of fermentation are thus explicable on the basis of tissue, nervous, and secretory dysfunction.

Diagnosis.—The diagnosis of the exact ætiology of the intestinal paralysis was not clear except in the light of the above experience. Previously the following diagnoses had been made: partial obstruction due to postoperative adhesions (case 1); abdominal tumour (cases 3 and 4); obesity (case 5); and intestinal obstruction (case 6). Since 1939, however, the exact nature of the intestinal dysfunction has in several instances been recognised, and in cases 4 and 7 intestinal paresis and partial obstruction have led to an accurate diagnosis of myxœdema, which had previously passed unrecognised.

Treatment.—Since wash-outs and purgatives are ineffective, and simple exploratory laparotomy has been found to be extremely dangerous in debilitated patients, an accurate and early diagnosis is essential to initiate effective therapy. Thus in case 4 administration of thyroxine (finally given intravenously) relieved an extremely grave condition, paralytic ileus supervening on dolichocolon. In case 5 thyroid treatment caused the symptoms to disappear for 2 years, but in cases 1, 2, 3, and 7 treatment was begun too late to relieve either

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the general disturbances associated with myxœdema or the intestinal symptoms.

SUMMARY

From a study of 29 cases of severe hypothyroidism the intestinal disturbances which may develop in this disease are described. These disturbances, which vary from simple constipation to the development of megacolon, and from abdominal distension to intestinal obstruction, appear to be very little known. Their clinical and pathological features are discussed.

Intestinal paresis may appear as the first important sign of an unrecognised or latent hypothyroidism. It is essential to recognise its exact nature to avoid disastrous surgical intervention and to institute effective therapy.

It appears practical to describe an "intestinal form of acquired myxœdema in adults" and, in the differential diagnosis of intestinal obstruction, to include the "paralytic ileus of myxœdema."

REFERENCES

Bastenie, P. A. (1945) *Bull. Acad. roy. Méd. Belgique*, in press.
Ceelen, W. (1921) *Beitr. path. Anat.* 69, 342.
Escamilla, R. F., Lisser, H., Shepardson, H. C. (1935) *Ann. intern. Med.* 9, 297.
Friedenwald, J., Morrison, S. (1933) *Endocrinology*, 17, 393.
Langeron, L. (1944) Précis d'endocrinologie clinique, Paris.
Means, J. H. (1937) The Thyroid and its Diseases, Philadelphia and London.
Pehu, M., cited by Langeron (1944).
Ribadeau-Dumas, L., cited by Langeron (1944).
Wegelin, C. (1926) in Henke and Lubarsch, Handbuch der speziellen pathologischen Anatomie und Histologie, Berlin.

GRAVID UTERUS IN A STRANGULATED HERNIA

ROBERT LAIRD
Ch.M. Glasg., F.R.C.S.E.
FORMERLY SENIOR RESIDENT SURGEON, ST. MARY ABBOTS HOSPITAL, L.C.C.

AN ovary in a hernial sac is uncommon, at least in relation to the number of repair operations performed. When the hernial contents include the uterus, the case is sufficiently rare to justify recording.

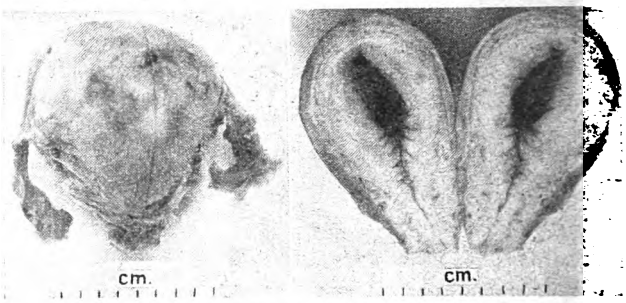
Watson (1938) collected 61 published cases of hernia of the non-gravid uterus and 30 of hernia of the gravid uterus. In nearly every case with a non-gravid uterus the hernia was inguinal, and the uterus in several instances was ill-developed. The gravid uterus has been reported in inguinal, umbilical, and ventral herniæ. McMillan (1942) reported a case of a non-gravid uterus in an indirect inguinal hernia. He could not find from the previous reports of cases whether the inguinal hysteroceles were direct or indirect and said that Ludington (1920) was the first to record a uterus in an indirect inguinal hernia, the patient being 19 months old.

There have been some surprising cases of hysterocele gravidarum. In 1531 Nicholas Pol was the first to record a gravid uterus in an inguinal hernia; a live child was recovered by cæsarean section through the hernial sac, but the mother died 1½ days after the operation. Adams (1889) collected 9 published cases of the gravid uterus in an inguinal hernia, 6 of the patients being subjected to cæsarean section, and all the children but only 3 of the mothers surviving. Olshausen (1870) records a case of spontaneous delivery from a uterus in a left inguinal hernia, both mother and child surviving.

CASE-RECORD

A woman, aged 42, was admitted to St. Mary Abbots Hospital in May, 1943, with a 14-year history of a lump in the right groin. At first the swelling was reducible, but shortly after the birth of her youngest child 4 years ago it came down and persisted. Two days before admission to hospital the swelling became larger and painful. She had nausea but no vomiting. The bowels had acted normally. There was no amenorrhœa, the last menstrual period being 14 days before admission. She had premenstrual dysmenorrhœa and excessive loss at the periods which lasted 6–7 days. She had had 6 spontaneous deliveries.

She was an obese pale woman, with a mass about 5 inches in diameter over the inner half of the right inguinal ligament. The mass was tender and irreducible, and there was no impulse on coughing. The abdomen was neither tender nor rigid. Pulse-rate 82 per min. Temperature 98·4° F. Hb 58%.



Gravid uterus removed at operation from inguinal hernia.

Operation was performed under gas-oxygen and ether anæsthesia. An incision was made over the swelling and, when the thick-walled hernial sac was opened, there was a gush of yellowish-brown fluid. The contents of the sac were an enlarged uterus and the ovaries and tubes of both sides. The whole uterus except the cervix lay outside the abdominal cavity. Its surface was covered with a fine film of fibrin, its body enlarged, and the whole organ, including the cervix, indurated. The ovaries and tubes appeared normal. None of the contents was adherent to the sac, and neither intestine nor omentum was present. The hernia was indirect inguinal, the deep epigastric vessels lying medial to the neck of the sac. Definite constriction was observed at the internal abdominal ring. Reduction of the uterus was impossible because of its size; and since it appeared to have undergone a pathological change a subtotal hysterectomy was performed, the whole operation being done outside the abdominal cavity. The ovaries were returned to the abdomen, and the hernia was repaired.

The patient was discharged on the 26th day after operation, the postoperative course being uneventful. Before her discharge from hospital a vaginal examination showed prolapse of the anterior and posterior vaginal walls. A cervical stump 1 in. long could be felt.

Pathology.—The uterus (see figure) weighed 549 g., and the body measured 12 cm. × 10 cm. × 6·5 cm. (maximum). The outer surface was smooth and covered with injected pale greyish-brown peritoneum except over the lower third of the anterior surface, which was roughened. On section the uterine wall was of a maximal thickness of 2·5 cm. and was greyish-white, with two seedling fibromyomata, the larger, in the posterior wall, measuring 1 cm. × 0·6 cm. × 0·6 cm. The endometrium was hypertrophied to a maximal thickness of 1·2 cm. and was greyish-white, polypous, and œdematous. The upper part of the cavity of the fundus contained a spongy purplish-brown hæmorrhagic mass, 3·5 cm. × 1·5 cm., in which there was a central oval smooth-walled cavity 1·2 cm. × 0·6 cm., with shaggy greyish-brown villous material in its posterior wall.

Microscopically there was considerable hypertrophy, œdema, and engorgement of vessels of the myometrium; polypous hypertrophy of the endometrium, with considerable hyperplasia of the glands and diffuse polymorphonuclear infiltration of the stroma; decidual reaction in the superficial half, with areas of fibrinoid degeneration, recent hæmorrhage, and numerous chorionic villi adherent to the surface.

SUMMARY AND CONCLUSIONS

In this case the indirect inguinal hernial sac contained a gravid uterus, both tubes, and both ovaries, and showed early strangulation. Since the hernia had been irreducible for 4 years, this is an example of impregnation

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of a uterus in a hernial sac, of which only one case has previously been recorded.

The possibility of the uterus being gravid was considered at operation but this was thought unlikely in view of the induration of the uterus and cervix, and because the last menstrual period took place only 14 days before. Hysterectomy appeared to be the only reasonable treatment in a woman of 42 with a pathological uterus. There were also the difficulties associated with the return of the uterus to the pelvis to be considered and its possible subsequent displacement through laxity of the ligaments.

Strangulation was caused by the enlarging gravid uterus filling the opening at the internal abdominal ring and pressing on the vessels.

Since the hernia had become irreducible shortly after the last confinement, it is reasonable to assume that the uterus entered the hernial sac during involution.

I wish to thank Dr. S. Robinson, of the central histological laboratory, Archway Hospital, for the pathological report.

REFERENCES

Adams, S. S. (1889) *Amer. J. Obstet.* **22**, 226.
Ludington, N. A. (1920) *N.Y. med. J.* **111**, 986.
McMillan, W. M. (1942) *Ann. Surg.* **116**, 266.
Olshausen, R. M. (1870) *Arch. Gynaek.* **1**, 41.
Watson, L. F. (1938) Hernia, St. Louis, p. 536.

AN UNUSUAL RECTO-VESICAL INJURY

RODNEY SMITH
M.S. Lond., F.R.C.S.
MAJOR R.A.M.C.

THE war provided many examples of recovery after injuries far more serious than that about to be described. Nevertheless, there were unusual features about this case which merit description, not the least of which was the association of a considerable rent in the bladder wall with retention of urine and a palpable distended bladder.

CASE-RECORD

An Indian soldier, aged 26, was knocked over by a slowly moving army vehicle. He fell in a sitting position on to an iron pick, the point of which penetrated his rectum. He walked without difficulty to a first-aid post, where he reported his misfortune but stated that he was in no pain or discomfort except that occasioned by blood collecting in the seat of his trousers. The medical officer who examined him found no visible injury but, seeing blood dribbling from the anus, placed him on a stretcher and sent for an ambulance. The case was not considered urgent, and he was admitted to a field surgical unit some 2½ hours later. By this time he had begun to complain of mild hypogastric discomfort and had tried without success to pass water.

On examination the patient, a cheerful well-nourished Indian, did not appear to be in any pain and showed no sign of shock. He had mild hypogastric discomfort and could not pass water. His bladder was tender and distended, reaching half-way to the umbilicus. There was no visible lesion at the anus, from which blood was still dribbling. Rectal examination was postponed until after catheterisation, and the patient was given an injection of 'Omnopon' gr. 1/3 with scopolamine gr. 1/150 and an hour later taken to the operating-theatre. It was considered that, in view of its distension, the bladder could not be perforated. The distension and retention were explained as being akin to the retention seen commonly after rectal operations. However, on passing a catheter almost pure blood was withdrawn, and the diagnosis had to be hastily revised. Penetration of the bladder now appeared certain, though the mechanism of the distension was not clear. Rectal examination and proctoscopy revealed a severe laceration of the anterior rectal wall, the depths of which were not explored with a finger.

Operation.—Transvesical repair of the lesion of the base of the bladder was considered the most suitable. An ample incision and adequate retraction gave a good view of the base of the bladder, in which there was found a large rent. The bladder, filling up with blood, had not emptied into the rectum, because the perforation was valvular, a triangular flap of mucosa overlying the hole through the muscle and effectively preventing any leakage. On lifting this flap, the tear through the muscular wall of the bladder could be examined and was repaired with interrupted sutures of catgut, after which the triangular mucosal flap was replaced and fixed with a single fine catgut suture through its apex. The bladder was then closed round a self-retaining catheter, placed as high as possible. A left inguinal colostomy was performed, but the perforation of the rectal wall was not sutured, as it was felt that by so doing a potentially infected dead space would be left between the sutured bladder and rectum without provision for drainage.

Postoperatively the suprapubic catheter was connected to a hydrostatic apparatus for continuous suction. Six days later the colostomy was trimmed and the suprapubic catheter removed. The fistula healed within a few days, and 14 days after operation the patient was evacuated to a general hospital with normal micturition. A follow-up card later gave the information that the rectal wound had healed, and that the colostomy had been successfully closed.

SUMMARY

A case is described of a severe rent of the rectum and the base of the bladder from an injury with a pick.

The perforation of the bladder being valvular caused the most misleading sign of acute retention with a distended bladder full of blood.

There was remarkable freedom from pain and shock considering the severity of the injury.

Quick recovery ensued after operation, which is described.

Preliminary Communication

SOUR MILK AND THE TUBERCLE BACILLUS

IT is widely believed that acid in milk kills tubercle bacilli or renders them avirulent. This belief persists in spite of numerous records of their recovery from cheese and other products which may be regarded as derivatives of sour milk. The specific case of milk was investigated at the National Institute for Research in Dairying some years ago by Mr. J. McClemont, who found that tubercle bacilli in naturally infected raw milk remained alive and virulent for many weeks after the milk had soured. Souring in milk is caused mainly by the growth of the lactic streptococci which produce a maximum acidity, calculated as lactic acid, of about 1% which, on all the evidence, cannot be said to kill tubercle bacilli.

It has been reported earlier[1,2] that an antibiotic substance of considerable power has been isolated from cultures of milk streptococci originally described by Whitehead.[3] There is little to distinguish these streptococci from others commonly found in milk, and they produce sour milk in the ordinary way. It has been shown that the antibiotic substance isolated from them is very active against streptococci in vivo and against other pathogens in vitro.[2] The most interesting feature, however, is that acid-fast organisms, including tubercle bacilli, are strongly inhibited in vitro.[4]

EXPERIMENTAL OBSERVATIONS

The following experiment to test the effect on the tubercle bacillus of actively growing inhibitory streptococci in milk has just been completed.

Sterile milk was inoculated with approximately known numbers of the Weybridge human C strain of the tubercle bacillus, 50 ml. of milk being inoculated with either 500 or 2000 bacilli per ml. To one-half of the portions into which the milk was divided was added 1% by volume of a 24-hour culture of an ordinary strain of

1. Oxford, A. E. *Biochem. J.* 1944, **38**, 178.
2. Mattick, A. T. R., Hirsch, A. *Nature, Lond.* 1944, **154**, 551.
3. Whitehead, H. R. *Biochem. J.* 1933, **27**, 1793.
4. Report on meeting of the Society for General Microbiology, *Nature, Lond.* 1945, **155**, 796. Mattick, A. T. R. *Endeavour*, 1946, **5**, 24.

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AUTOPSY FINDINGS IN GUINEAPIGS INJECTED INTRAMUSCULARLY WITH THE CENTRIFUGED DEPOSIT FROM CLOTTED MILK SAMPLES CONTAINING EITHER 500 OR 2000 TUBERCLE BACILLI PER ML. AND 1% BY VOLUME OF A 24-HOUR CULTURE OF EITHER THE CONTROL STREPTOCOCCUS OR THE INHIBITORY STREPTOCOCCUS

Guinea-pig. no.	Control streptococcus	Guinea-pig. no.	Inhibitory streptococcus
500 tubercle bacilli per ml.			
1, 2, 3, 4, 5	Regional lymphatics (popliteal, deep-seated inguinal sacro-lumbar): extensive caseation; spleen heavily infected. Liver infected. Lungs generally free	9, 10, 11, 12, 13	No signs of infection
2000 tubercle bacilli per ml.			
6, 7, 8	As above	14, 15, 16	No signs of infection
	Acid-fast organisms seen microscopically in all cases		No acid-fast organisms found microscopically

"starter" streptococcus (*Streptococcus cremoris*, strain 1. P5). The other portions received a similar inoculum of a 24-hour culture of one of the streptococci used for the production and isolation of the antibiotic substance (1354). Both were incubated at 30° C for two days. The milk samples had clotted overnight. They were then treated by Petroff's method in the ordinary way for sour-milk samples and the centrifuged deposits inoculated intramuscularly into the thighs of guineapigs. After eight weeks the animals were killed and examined. The results are shown in the table.

The results are clear cut, and it seems that the inhibitory streptococcus had produced sufficient antibiotic substance to kill or render avirulent up to 2000 tubercle bacilli per ml. in 50 ml. of milk and that no such effect was produced by the lactic streptococcus, which merely formed acid to a somewhat larger extent.

It can therefore be concluded that acidity as such does not destroy the tubercle bacillus in milk, but that if streptococci producing the inhibitory substance previously reported on are present these organisms are destroyed or made avirulent.

We are now investigating the effect on tuberculosis, in vivo, of a concentrated but still impure preparation.

A. T. R. MATTICK, B.Sc., Ph.D.
A. HIRSCH, B.Sc. Reading
National Institute for Research in Dairying, University of Reading.

Medical Societies

ROYAL SOCIETY OF MEDICINE

AT a meeting of the section of physical medicine on March 13, with Dr. J. W. T. PATTERSON, the president, in the chair, a discussion on the

Restoration of Function in Peripheral Nerve Injuries

was opened by Prof. H. J. SEDDON, who spoke on the basis of 6 years' experience in charge of the peripheral nerve unit at the Wingfield-Morris Orthopædic Hospital, Oxford. In reviewing the pathology of nerve injury he mentioned the usefulness of the classification adopted on the advice of Prof. Henry Cohen early in the war. Neurotmesis was a simple complete division of the nerve-trunk, as in an open wound, though equivalent changes followed severe crushes or the local injection of sulphonamides; there was no spontaneous recovery. Axonotmesis was the interruption of fibres within an intact sheath, and here there was almost perfect spontaneous recovery because the Schwann sheaths remained intact. There was often great difficulty in distinguishing between these two classes, and yet the distinction was all-important in deciding between conservatism and early operation. In the third class—neurapraxia—the changes after a nerve concussion consisted of myelin-sheath degeneration, so the motor fibres with their larger sheaths were always more affected; there was no reaction of degeneration in the affected groups (though the threshold to stimulation might be increased) and the condition cleared up in a few days or weeks. The most devastating of all nerve injuries were those due to stretching, because the damage was spread over a considerable length even though the trunk gave way at only one point, just as the individual strands of a rope yield at different levels before the rope breaks; these cases were almost beyond surgical repair, for though wide excision and grafting was theoretically indicated this had met with little practical success. Partial lesions often presented very complex and difficult diagnostic problems, and a point worth emphasising was the anomalous-ulnar innervation of the superficial thenar muscles; this was so frequent that anatomy textbooks needed to be revised on this point. One difficulty in recovery after nerve injuries was that the Schwann tubes in the peripheral stump shrank so much that new fibres found it difficult to re-enter them; and, since function was intimately related to fibre-diameter, this often meant that poor function might accompany the best reinnervation. Hence the importance of early repair, especially in high lesions, where in any case gross changes were bound to occur in the lowest portions of the distal stump. Another reason for early suture was the progressive disparity in the size of the end-bulbs, and a third reason was the increasing degeneration of the paralysed muscle-fibres. A good deal of new information had been gained about this latter point during the war. There was no true degeneration as in the nerve-fibres; the muscle-fibres did not break up, but the motor end-plates disappeared and interstitial fibrosis spread and eventually replaced the fibres altogether. This process continued remorselessly over the years, though ghosts of fibres with their cross-striation persisted for many months. The practical point was to decide how long these changes remained reversible and when the last hope of recovery was gone. Here muscle biopsy might be useful in deciding the worth of a delayed nerve-suture; after a year the outlook was always serious. A factor gravely affecting the general prognosis was fibrosis of joint-capsules and tendon-sheaths due to deposition of collagen from œdema fluid, and made worse by the immobility of paralysis. When this was severe it rendered useless the most perfect suture and fibre-regrowth in the nerve itself. As far as the rate of regeneration was concerned, the old estimate of a millimetre a day was not far out, but in fact the curve of recovery was not a straight line but one which began rapidly and then tailed off with increasing slowness. Knowledge of the usual recovery-rate was of great practical value. With wound cases the likelihood of complete division was such, and the chances of spontaneous recovery so small, that exploration was always indicated eventually. But in closed nerve injuries, such as those accompanying simple fractures, most of the cases were due to axonotmesis and would recover by themselves; these were therefore best left alone, but this temporarily conservative attitude would be abandoned in the one case in twenty where the first signs of muscular contraction were not seen when the period calculated from the approximate rate of regeneration had elapsed. The electromyogram now gave rather earlier information of the arrival of motor fibres at a muscle than did the clinical data.

Professor Seddon emphasised that a perfect functional result could never be obtained after nerve-suture because of the winding paths taken by the regrowing fibres, and because of imperfect remyelinisation; moreover there was confusion of motor fibres, so that, for instance, contraction of the first dorsal interosseous muscle always accompanied the command to abduct the little finger. Fine sensory discrimination was never fully regained, and this was most important in lesions of the median nerve. The organisation and treatment of peripheral nerve injuries depended entirely on these basic facts of neural and muscular pathology. After open wounds it was necessary to get cases early and operate after a few weeks

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without waiting for signs of recovery, and it was of paramount importance to prevent stiffness, which was always possible, by early motion; nerve-splintage was not the equivalent of fracture-splintage in this respect, and the joints must be moved 2–3 times daily. Though early operation was essential, this did not extend to actual primary suture, for in many cases the damage was not finally delimited until a few weeks had elapsed, while with time the originally frayed epineurium hypertrophied and became more capable of taking sutures; in securing early delayed suture, skin-grafting was of much importance in closing the original wound.

The vexed question of whether regular electrical stimulation could prevent muscular degeneration while awaiting recovery after suture had been settled by the experimental observations of Guttmann and by the clinical findings obtained at Oxford. Galvanism would always maintain muscle volume, or nearly so, though it would not make up for the shrinkage occurring before treatment was begun; so it was impossible to start too early. Though animal experiments corresponded to a daily treatment of several hours' duration, in clinical practice it was enough to give a short session provided that this was done every day and not merely on alternate days. It was best to use the largest possible current, with short duration to avoid the painful electrolytic changes under the skin that followed a slow regulating-device like the mercury metronome; 100 contractions at a session was sufficient, using three groups of 30 stimuli with 3 minutes' rest between each group; the treatment was continued until the muscle could act against gravity, when active exercises and faradism were substituted. When this stage was reached some confusion in re-education was common because of lack of sensory discrimination and the imperfect control of independent movement in the digits. Occupational therapy was here of great value in aiding mobility and muscle-power, and in helping the recovery of tactile discrimination when the median nerve was involved; in the latter case patients often tended to use their 4th and 5th fingers for fine work if not induced to do otherwise.

Lastly, Professor Seddon recalled the various compensatory devices available for imperfect recovery, such as selective redevelopment of other muscles and operations such as tendon-transplantation or arthrodesis. He made a plea for peripheral nerve injuries to be given the same place in peace as in war, and pointed out that in no branch of trauma were the methods of physical medicine so important to the final result. There was a good deal to be said for ridding outpatient departments of their many hopeless cases and concentrating their resources on those that would most benefit from close attention.

Dr. W. RITCHIE RUSSELL stressed the need for teaching the patient to perform his own passive movements through a full range and not allowing him to leave it to the masseuse. In all cases, especially in civilians, there should be a periodic assessment of the social position of the patient from the point of view of the function attained and the wisdom or otherwise of continuing treatment; here the clinician and the social worker could usefully collaborate, for these patients had to readjust their former ambitions.

Mr. J. ELLIS mentioned the individual constitutional differences in the liability to fibrosis and stiffness, associated with differences in the degree of vasomotor disturbance, which tended to be greater also with the height of the lesion.

Prof. J. Z. YOUNG, F.R.S., thought that one of the factors that prevented wasting in passive movement was the maintenance of full length; experimentally, galvanic contraction against resistance completely prevented any shrinkage taking place.

Dr. F. S. COOKSEY wondered whether it might not be advisable to rest the part at the first reappearance of active muscular contraction for fear of disturbing the reconnexion of the nerve-fibres with the motor end-plates. He allowed patients to treat themselves at home with a simple apparatus based on a 60-volt high-tension battery and found that the more intelligent could easily manage this while remaining at work.

Professor SEDDON, in reply, agreed that self-treatment at home was possible with a foolproof galvanic machine. Rehabilitation was encouraged by retraining at vocational centres at the earliest possible stage, and he believed in explaining fully to the patient the probable duration of treatment and final disability. He confirmed the increased tendency to stiffness with high lesions and the necessity for hard work by the physiotherapist in these cases; there was an enormous tendency to stiffness in painful irritative partial lesions, and these should be tackled by relieving pain by exploration or even sympathectomy at an early date. There was no doubt that muscles wasted more extensively if allowed to shorten, and recent experimental work in Australia indicated that paralysed muscles were best treated electrically if kept on the stretch—a feature which had been attributed by Dr. P. BAUWENS during the discussion to the maintenance of a higher tension within the muscular envelope and the squeezing-out of œdema fluid.

Reviews of Books

Anæsthesia in Operations for Goitre

STANLEY ROWBOTHAM, M.D., D.A., anæsthetist to the Royal Free Hospital, Charing Cross Hospital, and the Royal Cancer Hospital. Oxford: Blackwell Scientific Publications. Pp. 104. 12*s*. 6*d*.

THE few surgeons who still insist on the right to direct the anæsthetic as well as the operation would do well to read Dr. Rowbotham's book. Here is displayed the great amount of clinical detail and judgment involved in anæsthesia for goitre operations alone. The methods described have gradually evolved through an accumulation of experience in large thyroid clinics, and nobody is better qualified to describe them than the author, who for years was Joll's anæsthetist at the Royal Free Hospital. He does not stint the reader. It is refreshing indeed to find that before discussing the anæsthetic technique to be employed he gives brief but sufficient descriptions of the clinical and pathological features of the patient's disease. There is a good chapter on the examination of the patient by the anæsthetist; the latter is so often at a loss how to interpret the preoperative clinical features, in so far as the anæsthetic method is concerned, that this is one of the most helpful parts of the book. Both local analgesia and general anæsthesia are described, but emphasis is rightly laid on points which the author has himself found significant. He is a staunch advocate of endotracheal intubation and favours subcutaneous injection for hæmostasis. The acerbity and dogmatism which characterise discussions on intubation for thyroid operations leave the inexperienced anæsthetist and surgeon a little bewildered, and the fact that intubation is the routine method advocated by someone as experienced as Dr. Rowbotham, for reasons clearly stated, will be noted in centres where a goitre operation is a rarity. The book concludes with a description of postoperative complications and their treatment—important for the anæsthetist because on him may fall the onus of the immediate treatment. The text is well illustrated and the work as a whole is a credit both to author and publisher.

Principles of Human Physiology (Starling)

(9th ed.) C. LOVATT EVANS, D.SC., LL.D., F.R.C.P., F.R.S., Jodrell Professor of Physiology, University College, London. London: Churchill. Pp. 1155. 36*s*.

THIS is the only surviving British textbook which makes more than a superficial attempt to present at once physiology and the scientific method of its development. The latter is well documented by references which do not overlook the European literature, and a degree of historical perspective is preserved which becomes ever more valuable as the years pass. For the first time we are given a series of historical introductions, which are modestly referred to by the author, but which must have cost much time and trouble.

The first question about the new edition of any scientific textbook is whether it is up to date, but that is now becoming tempered by anxiety as to whether it has sunk to the level of a report on the latest football results. Many results have been incorporated in this edition of "Starling" without changing its balance or stifling the thoughts which pass from writer to reader. The more closely physiology sticks to its origins in the laboratory, the less systematic it appears as a whole, and this book is therefore no revelation of the subject to be digested at

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a sitting. Its interest lies in its contact with the actual as distinct from the theoretical, and in its accounts of detail and experiment. It is a book to be studied by all who take physiology seriously—not so much for the knowledge it imparts as for the idea it conveys of how knowledge is acquired. In the last two editions Professor Lovatt Evans seems to have felt less tied down to the original format, and the result is a better illustrated and more modern work. The section on the central nervous system is remarkably original for a textbook treatment and emphasises the fundamental processes of the conduction and transmission of excitation. In all the other sections the basic principles and a clear account of modern methods are skilfully combined.

A Food Plan for India

Royal Institute of International Affairs. With a foreword by Prof. A. V. HILL. London: Oxford University Press. Pp. 63. 3s. 6d.

THE anonymous authors of this plan calculate that in 1953 the food requirements of India will be about 25% more than is produced at present, and they seek to bridge this gap. They concentrate on five measures for increasing food-production—the use of fertilisers and manures, the improvement of water-supplies and erosion control, the use of improved varieties of seed, the control of seed-borne diseases and of seed pests, and the control of malaria. They also put forward a modest scheme for training as agricultural officials some 25,000 Indians of the N.C.O. class on demobilisation from the Forces. They make no attempt, however, to relate the Indian food shortage to the general world position, or to tackle the vast social problems on whose solution the lasting amelioration of conditions in India depends. While the measures they do propose are necessary, they are so obvious and so limited in scope that it is doubtful how far it is useful to publish them while so much of greater importance is omitted. Indeed, many of these measures are already being taught to peasant cultivators at present in the army, and have therefore been accepted in principle by the government of India. But no mention is made of the difficulty of ensuring that food produced in India today actually reaches the consumer at a price he can afford to pay. Hoarding and the rocketing of food prices were among the chief causes of the 1943 famine in Bengal, and the remedy for such evils lies in extensive social change, including government control of all stocks of food. Again, the present system of fragmentation and subdivision of the land until the holdings become too small for economical cultivation is a major barrier to improved agriculture. Little mention is made of this, or of the peasants' coöperative movement which is attacking this problem at its roots. There is no word about the widely recognised necessity for some form of collective farming. And finally, the authors ignore the probable repercussions on the agrarian system of widespread industrialisation, which is bound to come in the near future, and which may, more than any other single factor, relieve the present appalling pressure on the land.

The food crisis in India is so large a part of the general world food shortage that it must be considered as part of the world problem. In the circumstances, this academic report has an air of unreality.

New Inventions

AN AUTOMATIC PNEUMOENCEPHALOGRAPHIC APPARATUS

THE object of Osborne's "automatic pneumoencephalograph"[1] is the simultaneous replacement of cerebrospinal fluid (C.S.F.) by gas. Unfortunately his apparatus was found to be unsatisfactory because C.S.F. persistently flowed through the upper needle. The apparatus here described (fig. 1) works well, is easily managed, and retains the advantages of diminished discomfort for the patient during and after the operation.

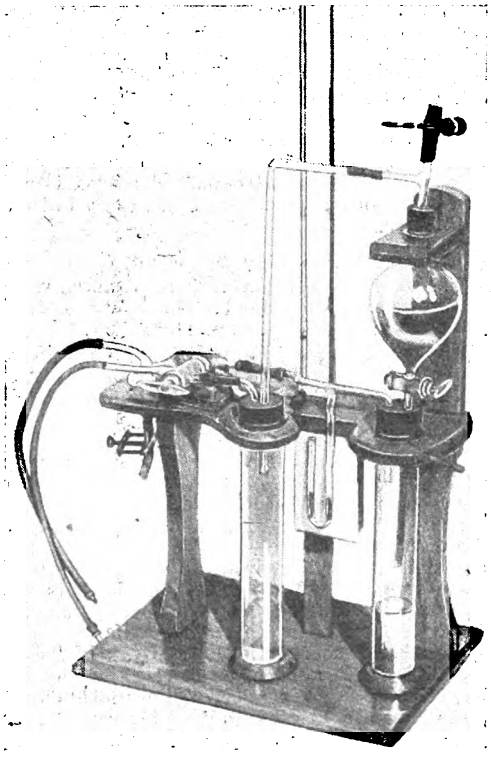

Fig. 1—The apparatus assembled.

Double rachiocentesis is performed in two suitable interspaces. About 10 c.cm. of C.S.F. is allowed to run off. Rubber tube A (fig. 2) is connected to the lower needle with a 'Record' needle adaptor. The two-way tap, B, enables C.S.F. to pass into capillary manometer C or graduated tube D. The C.S.F. pressure having been taken, tap B is turned to allow the fluid to run into D. Tap G is then turned on, and rubber tube K is immediately connected to the upper needle. Mercury drops into graduated tube F, thus producing a partial vacuum at H which ensures flow of fluid through the lower needle. As tube F fills up, air is displaced through the cotton-wool filter I and so into the upper needle with a pressure indicated by the small mercury manometer E. Absence of pressure rise in E indicates an air leak. The trap J catches any C.S.F. which may leak through the upper needle. Once the operation has been started, filtered air automatically takes the place of outflowing C.S.F. In this way the desired amount of air can be introduced.

Obstruction in the lower system is immediately revealed by cessation of flow into D, and in the upper system by mounting pressure in manometer E. The C.S.F. pressure can be checked at any time. By means of the tap L, normally kept closed throughout the operation, the negative pressure in D and H can be reduced. It is helpful, when operating, to keep the apparatus at a level below that of the lower needle.

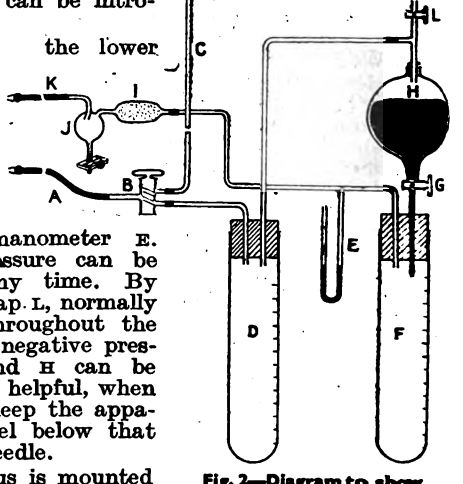

Fig. 2—Diagram to show principles of the apparatus.

The apparatus is mounted on a light wooden frame. It is easily assembled and dismantled. Only parts A, B, C, I, J, and K need be sterilised. In practice, sterilisation of B and C is a refinement, because their internal volume being small compared with that of A, backflow of the C.S.F. into the patient is practically impossible.

The apparatus is obtainable from Down Bros. Ltd.

M. B. BRODY, M.D. Sheff., D.P.M.
T. C. HALL, M.S.R.
Runwell Hospital, Nr. Wickford, Essex.

1. Osborne, R.L. *Arch. Neurol. Psychiat.* 1944, 51, 405.

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THE LANCET

LONDON: SATURDAY, MARCH 23, 1946

Participation

THE Government and the profession have the same aim: we all want to see that whatever person can benefit from medical knowledge or skill shall have it without hindrance. We all want to see the best use made of medical resources; and most of us recognise that many removable obstacles still stand in the way of efficient practice. The main object of every plan for medical reform has been to remove such obstacles.

The three Governments of the last two years have agreed in wishing to get rid of the obstacle of cost: the means test is to be taken out of medicine, and henceforth the patient will not be separated from his doctor by inability to pay for the attention he requires. But, apart from money, there are other barriers, not only between doctor and patient, but also between the thousands of services, multicellular and unicellular, through which medicine is practised in this country: all sorts of considerations besides medical need govern the disposal of patients—or their non-disposal. Our first question about any scheme of reform should be, Will it break down the barriers between existing services so that the flow of patients can follow natural channels unimpeded? Will it integrate these services, so that patients have continuous care? Will it, in short, simplify the unbelievably complex arrangements under which the work is done today? But we must also ask a second question, equally important. Is this process of simplifying, integrating, and organising going to be carried so far as to defeat its own ends, by taking the heart out of the innumerable people who have hitherto been running their own show, large or small, in their own way? Will the rationalised services preserve incentives and the liberty of thought and action without which medicine, however lavishly equipped, would cease to improve and might rapidly deteriorate? Are we asked to sacrifice quality for the sake of quantity? Before considering how far the National Health Service Bill is acceptable to the profession, let us look at it in the light of these questions.

AN INTEGRATED SERVICE?

This, though the first Bill, is the third Government plan put before us; and they differ mainly in their treatment of hospital and specialist services. The Coalition white-paper of 1943 entrusted these services to 30–40 joint boards formed of representatives of the major local authorities, advised by vocational committees. The boards, while taking over all municipal hospitals, were to obtain by contract the services of the voluntary hospitals, which were to remain under their own management. Though the major local authorities were to retain clinics of their own, and also provide the health centres for general practice, the scheme gained coherence from the fact that each joint board had to prepare a plan for all the health services of its area and had to see that the plan was carried through: it combined planning with administration. Judged as a means of securing early integration of the medical services, the revised scheme later produced by Mr. WILLINK was inferior: both voluntary and local-authority hospitals were to be left with their present owners, and though planning bodies were to be set up at area and regional levels they were to be purely advisory. By this arrangement the Ministry of Health became responsible for conducting the whole enormous orchestra; and as it had no power over any hospital except the power to withhold grants, the process of rationalisation was unlikely to be rapid. Hence, though the Willink plan had the substantial merit of satisfying most of the people who would have to work it, it also had the faults of compromise: it left a great many barriers intact, relying for their removal on the attritive passage of time. Mr. ANEURIN BEVAN, a man in more of a hurry, proposes bolder action.

Mr. BEVAN believes that the hospitals will never achieve functional unity until they are united for the common purpose under common ownership. If this is granted, the only conceivable owner is the public, as represented in local or central government authorities. The present areas of local government are unsuited to hospital organisation; so the alternative is ownership by the State. Mr. BEVAN'S Bill places all hospitals, voluntary and municipal, in the hands of the Ministry of Health, for participation in a unified hospital service. The Ministry, however, is to delegate most of their administration to 16–20 regional boards consisting of persons chosen by the Minister for their individual suitability. These boards of Ministerial nominees have the duty of developing the best possible hospital and consultant service for their region, including provision for tuberculosis, venereal disease, and various other items hitherto in the province of the medical officer of health.

It is evident that within the hospital service of each region this new scheme would permit and promote a high degree of integration—higher than under any scheme previously put forward. Its boldness, moreover, has attractions. Where it seems to fall short is in failure to relate the integrated hospital services to the equally important services of general practice and public health. The white-paper's joint board was concerned with these last in so far as it had to fit them into its area plan; but the regional hospital board, rather more distant from local affairs, need pay no heed to them at all. For all the Bill has to say to the contrary, the work left in charge of the local health authority—epidemiology, school medicine, health-visiting, maternity and child welfare, and domiciliary midwifery—might have nothing to do with the work of hospitals: the woman who is to be confined at home will go through pregnancy under a different organisation from the woman who is to be confined in an institution, though she may have to change suddenly from the one to the other. Again, it will still be possible for doctors in separate practice to work in administrative isolation from both public-health and hospital services; and general practice in health centres may be complicated by the provision that doctors, dentists, pharmacists, and (for the time being) opticians have their contract with the new local executive council, whereas the ancillary staff and buildings will come under the medical officer of

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health. We must regret, too, that industrial medicine is not yet brought into the picture of the National Health Service.

It would be possible, however, to lay too much stress on these defects and anomalies, most of which appear in all the three official plans, and all of which arise from concessions to the status quo. The position as we see it is that while the Bevan plan goes a very long way towards integrating the hospital services it frankly leaves the further integration of these services with public health and general practice to be achieved by skilful administration—and by the right spirit in those concerned. It may fairly be assumed that those responsible for the hospitals, from the Ministry downwards, will be anxious to make their work fit in with that of the practitioner and the M.O.H., and will want to bring off a successful marriage between the central and local services. From the standpoint of the profession it would undoubtedly be preferable to put all the remedial services under the regional boards; but it is understandable that a Minister seeking general acquiescence should avoid or postpone this solution. A more radical attempt to unify the various branches of medical practice by Act of Parliament might turn out even less pleasing than the present scheme to those who will criticise its diversity; and we should perhaps be thankful that Mr. BEVAN, in storming the Bastille of the hospitals, shows no inclination to proclaim the complete revolution in medical organisation which logic or his own convictions might dictate. Instead his Bill, while breaking down many barriers, still gives us an opportunity to develop something other than the highly centralised State medical service which most of us are anxious to avoid. Looking a little ahead, it appears possible that if the new hospital boards prove equal to added burdens they may eventually become the principal health authorities for their regions. If in course of time, with the long overdue reform of local government, they were to take over the health centres and also assume responsibility for public health, they would reunite environmental and remedial medicine; and if sufficient powers were delegated to them from the centre, the National Health Service, instead of being centralised and uniform, would come to consist of a score of semi-autonomous regional services, in useful competition for prestige.

QUALITY OF THE SERVICE

As regards integration, then, the Government's new scheme scores fairly high marks—higher than any of its forerunners. But we also have to consider how much damage to the health services may be done in drawing them together.

Mr. BEVAN'S chief innovation is the expropriation of hospitals. As doctors we are not specially concerned with the ethics of this proposal: the public must decide for themselves whether the Minister should be allowed to substitute himself for the existing trustees. On the other hand, we are as doctors clearly called on to express opinions about the precautions needed to save our work from suffering by such a change. The evil to be apprehended is in brief a rigid standardised service in which the good, or moderately good, regularly defeats the best; in which red tape slows all movement; in which the sweetness of originality is wasted on a bureaucratic air; and in which the staff, sinking into mediocrity, work no longer and no harder than is expected of them. All this is possible in an immense centrally controlled hospital service; indeed all this is inevitable, unless the arrangements permit of flexibility, variety, responsibility, enterprise, and enthusiasm. How does the Bill stand this test?

In the first place, it gives the teaching hospitals a high degree of freedom from control. As self-governing institutions closely associated with universities, they will have money to spend in their own way, and should be able to play their traditional part in the advance of medicine. Secondly, the remaining hospitals of the country will not be administered centrally by the Ministry of Health, but regionally through the hospital boards, to which large financial and other powers are delegated. Thirdly, the day-to-day working of each big hospital, or small group of hospitals, will be entrusted by the regional board to a local management committee; and for every hospital in a group there can also be a house-committee. If—repeat if—the reins are held lightly by each superior body this system of delegated control might still leave interesting tasks, and a sense of responsibility, to people managing each individual hospital. Their keenness and sense of effective service, which it is vital to maintain, would be greatly increased, however, if all of them—not merely the regional boards—were in a position to spend, at their own unquestioned discretion, even a small amount of money on the institutions in their charge. We note that the Government have decided that the funds now held in trust by voluntary hospitals shall not be swallowed by the Treasury, but shall be distributed as endowments to the regional boards, which will also be in a position to receive voluntary donations. Much would be gained if the boards were instructed to divide the endowment income among their constituent hospitals—or at any rate among the local management committees—so that each of these would have pocket-money in hand for personal expenditure, with permission to increase it by accepting gifts from grateful patients and local patriots. If every hospital in this way had a chance to pursue some excellence—to provide something special to itself, over and above the requirements of the service—there would be far more likelihood of getting capable people to give time and thought to its affairs. Unless it preserves the local interest that has done so much for British hospitals, Mr. BEVAN'S plan will have grave losses to set against its gains. Nobody worth having will join a committee which has nothing important to decide, and a good criterion of success in this as in other big services will be the extent to which it permits important decisions at the periphery.

Which brings us to the general practitioner. Is there any reason to think that in the National Health Service he would be less responsible and professionally independent than the panel doctor of today? We see none. Remuneration will from the start be higher, of course, than under National Health Insurance, and we may hope that the circumstances of practice will be steadily improved for patient and doctor alike; but the manner of employment will be no more onerous. The local executive council, with whom the practitioner will make his contract, will consist

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equally of representatives of the public and of the professions concerned, and should thus be preferable to the present insurance committees which it functionally resembles. The proposal to introduce a basic salary in addition to capitation fees is sure to draw heavy fire: it is convenient because a man's basic salary can readily be supplemented in recognition of experience or ability, or to compensate him for unremunerative or unpleasant conditions of work; but it would be idle to deny that it might be a step towards a fully salaried service. Those who think financial competition a necessary spur to good work in general practice will deplore any tendency towards payment by salary; but it will be observed that the present compromise by no means abolishes competition, and leaves further policy to be decided on the experience gained by groups of practitioners in health centres. Under the Bill such centres are to be set up as occasion offers, and doctors joining them will be expected to limit the competitive element in their practice by dividing the pooled capitation fees on a basis of partnership.

Every practitioner entering the National Health Service on the appointed day—whether he undertakes full-time or part-time work, from a health centre or from his own surgery—will be able to go on practising in the same place as before; and in surrendering to the Government his right to sell his practice he will receive compensation on a scale which will, we believe, be generally considered fair. After the appointed day it will be the duty of the local executive council, in consultation with a central body known as the Medical Practices Committee, to decide whether there is room for new entrants to its area, and to make contracts with them. It has always seemed to us that this negative power to prevent entry into medically overcrowded districts would be unavoidable in any service guaranteeing medical care to the whole community; but it does not exclude positive attraction by other means to places where practitioners are specially wanted.

The more even distribution of specialists is left to the regional hospital boards, which, with the help of advisory panels, will appoint consultants and specialists to the hospitals of their region. These may be employed either full-time or part-time, and consultants taking part in the public service will not be debarred from seeing private patients. A remarkable feature of the proposed arrangements is that, subject to certain provisos, the consultants so employed will be allowed to bring private patients into hospital pay-beds, and charge them fees on an approved scale. This readily assailable suggestion illustrates at least the Government's wish to keep as many consultants as possible in association with the hospitals. So far as is feasible, practitioners and patients will be able to choose their own consultant; and in administering the service the aim, we are told, will always be to bring practitioners into close relation with their colleagues in hospital.

And here we come back to the fact that the quality of this vast service will depend on how it is administered. Though legislation can prevent a good service it cannot create one, and the medical profession will therefore be right in attaching special importance to the mechanisms by which it can influence administration. These are numerous. At the highest level is the Central Health Advisory Council, with a majority of medical members, surveying the whole field. In the teaching hospitals the boards of governors will (at last) include members of the medical staff. Similarly on the regional hospital boards there will be representatives of specialist and general medicine, while the hospital management committees will also have professional members. In every hospital there is likely to be a medical staff committee, and no doubt in every health centre too. Half the members of the local executive council will be nominated by the doctors, dentists, and pharmacists of the locality, and the Medical Practices Committee will be mainly professional in composition. Thus medicine, as its spokesmen have desired, will be represented both in executive and advisory capacities. In addition university teachers and persons with experience of voluntary hospitals, as well as members of local authorities, may be invited to join the regional hospital boards. Nevertheless the Bill as it stands will not completely reassure those who fear that in practice the representation of professional and unofficial experts could be so small as to vitiate the whole scheme. As an alternative to control by local authorities we are now offered control by the nominees of a Minister; and, though this rather remote form of democratic government may be well suited to its present purpose, we are entitled to something more than personal assurances about the constitution of the bodies to be appointed. Otherwise one of Mr. BEVAN'S successors might defeat the object of all these administrative safeguards by an improper "political" choice of governors for teaching hospitals and for regional hospital boards.

The better integration of medical services is capable of raising their quality instead of lowering it. But this will not happen unless they secure devoted work from a great many people. All of these must know that their voice can be heard; and all must have reason to feel that the new service is theirs to make or mar.

IS IT ACCEPTABLE?

This Bill is the fruit of years of discussion. When the Labour Government came into office last summer many believed that the new Minister would set aside the work of his predecessors and produce an entirely new measure. He has not done so. His drastic solution of the hospital problem is his own, but his proposals for practice are essentially the same as those evolved by Mr. WILLINK from the white-paper of 1943. The process of evolution was profoundly influenced by representations from the medical profession on the conditions that might win assent; and however we may resent Government intervention in our calling, we must agree that a great deal has been conceded to professional opinion. Seldom has a Bill been presented after so full a canvass of those affected, or so wide an exploration of alternatives; and the outcome is not the doctrinaire Socialist programme that was deemed inevitable.

To a profession of individualists the whole conception of Government control is repugnant. To some it may seem that, whatever the safeguards, such control must mean the triumph of bureaucracy over medicine, and the degeneration of much we hold dear. Nevertheless there is another possibility—

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the triumph of medicine, in its own field, over bureaucracy. Even if it were true (which it is not) that under this Bill doctors will become civil servants, we must note that the nature of civil service is now changing before our eyes because the enlarging machinery of State is demanding the care of more and more technicians. In the Ministry of Health we are already seeing a new kind of civil servant—the clinician who spends part of his days in administration while continuing active clinical practice in the remainder. The National Health Service could gain much motive power from doctors acting, at all its levels, in a similar rôle. In any medical service the opinion of medical men and women, when adequately expressed, is bound to command attention; and if it cares to apply its energies to continuous improvement of the National Health Service the profession cannot fail to produce something finer than we have yet known. Something, moreover, instinct still with the motives of our forefathers and the spirit of science, which would be cherished as always in our teaching schools and communicated in long formative years to every student.

It is easy to be too much afraid. We should ask ourselves whether, with all its risks, the Service contemplated does not give us opportunities. It is a great end—that whatever person can benefit from medical knowledge or skill shall have it without hindrance. The means now proposed to that end may need modification, but they certainly do not call for wholesale condemnation or irreconcilable opposition.

Annotations

F.R.S.

THE names of five medical men appear among those recommended by the council for election to the fellowship of the Royal Society. Dr. F. M. R. Walshe, physician to the National Hospital, Queen Square, physician in charge of the neurological department at University College Hospital, and editor of *Brain*, not only holds high rank among the neurologists of the day but is known throughout the profession as an incisive writer, brilliant alike in criticism and construction. Dr. G. R. Cameron, who as professor of morbid anatomy at University College Hospital, and assistant editor of the *Journal of Pathology and Bacteriology*, has inherited the mantle of A. E. Boycott, has during the war been engaged on research for the Government, including investigations, familiar to our readers, on the visceral effects of blast and on the local absorption of toxic substances such as tannic acid. Brigadier J. A. Sinton, V.C., of the Indian Medical Service, was formerly director of the Malaria Survey of India, and after retiring in 1938 returned to official service during the war, in which his exceptional knowledge of malaria and its transmission has been re-employed to good purpose. Dr. J. W. Trevan, both before and since his appointment as director of the Wellcome Physiological Research Laboratories, has played an important part in investigations leading to the clinical trial and use of a wide variety of pharmacological substances. Dr. G. L. Brown, of the National Institute for Medical Research, took part before the war in the work initiated by Dale on the transmission of nerve impulses. He became secretary of the Royal Naval Personnel Research Committee, linking the medical department of the Admiralty with the Medical Research Council, and he is hon. secretary of the Physiological Society. We are also happy to note that the non-medical fellows are to include Mr. Frank Dickens, D.SC., at present director of research of the North of England branch of the British Empire Cancer Campaign, in recognition of his outstanding work on cell metabolism.

MILESTONE IN ANÆSTHESIA

AFTER a stagnant period of nearly a hundred years as a pharmacological laboratory tool, curare has suddenly become an anæsthetic necessity. Although the early clinical investigations were carried out in this country [1] and its utility in treating conditions characterised by spasticity or convulsions (e.g., tetanus) was then demonstrated, it was left to Bennett [2] and Griffiths [3] in Canada to exploit in psychiatric and anæsthetic practice its remarkable property of paralysing voluntary muscle. The former clinical taboo on curare is now removed with a vengeance, and an instrument of perhaps tremendous possibility for good has been placed in the hands of anæsthetists and physicians. For two or three years now curare has been used in Britain by anæsthetists fortunate enough to get supplies and courageous enough to employ them, and the first important report on clinical experiences with the drug in this country has just been made to the Royal Society of Medicine by Dr. T. C. Gray and Dr. John Halton, of Liverpool, who called the introduction of curare "a milestone in anæsthesia." Upwards of 1000 of their cases received curare in the form of crystalline *d*-tubocurarine chloride. In all these, curarine had saved the patient from having to be kept at a deep level of general anæsthesia.

The chief indication for curarine is in abdominal surgery. Its selective action on the voluntary muscles enables profound relaxation to be produced quickly and easily, and at little cost to the patient reckoned in terms of damage to vital organs. Only small amounts of general anæsthetic are needed to keep the patient asleep and insensitive to pain. The dose of curarine is critical and too much leads to cessation of respiration. However, this effect of the drug is short-lived; artificial respiration soon restores normal respiratory activity and all is well in a few minutes. 'Prostigmin,' a specific antidote to curarine in animals, has so far not had a striking effect in neutralising curarine in man. A curarised patient has a completely paralysed abdominal wall and is incapable of making any response to stimulation; from the surgeon's point of view he is like a patient under deep ether, spinal anæsthesia, or extensive regional block; but the retention of active intestinal peristalsis, the rapid recovery from the anæsthetic, and the smooth, shock-free convalescence make an operation under curare far less of an ordeal for the patient. Curarine is also useful when performing tracheal intubation under light general anæsthesia. Mixed with 'Pentothal' (e.g., 15 mg. of curarine with 0·5 g. of pentothal) a single injection puts the patient to sleep and provides sufficient relaxation of the jaw and obtundation of the reflexes for a leisurely laryngoscopy. Here curare takes the place of cocaine—a drug not without its hazards. Curarine may be used to subdue not only reflexes from the abdominal viscera but also troublesome reflexes from any other part of the body. Thus, Halton gives it in thoracic operations to prevent the annoying coughing which results from stimuli in the neighbourhood of the hilum of the lung and the heart. There is then no need for either elaborate cocainisation or deep anæsthesia, while the atonic state of the respiratory muscles produced by curarine makes inflation of the lungs easy. Another report [4] describes curare performing similar services

1. Cole, L. *Lancet*, 1934, ii, 475; Mitchell, J. S. *Ibid*, 1935, i, 262; West, R. *Ibid*, 1936, i, 12.
2. Bennett, A. E. *J. Amer. med. Ass.* 1940, **114**, 3222.
3. Griffiths, H. R., Johnson, G. E. *Anesthesiology*, 1944, **3**, 418.
4. Simmons, H. J. *Brit. J. Anæsth.* 1946, **20**, 34.

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during operations for hæmorrhoids, and a host of minor procedures, such as manipulation of a joint or insertion of a proctoscope, are made easy by the relaxing power of the drug.

There can be little doubt that curare has come to stay. So conservative physicians and surgeons must reorientate their views about curare, the arrowhead poison: views carried over from the pharmacology course of student days. Curare has only one bad effect—in an overdose it arrests respiration. Pentothal does the same, but whereas pentothal depresses all the vital organs curare has a selective peripheral action on the voluntary muscles. The "safety" of curare properly administered is therefore not less than that of pentothal. Both drugs need experience not only of dosage and effect but of the treatment of overdose. No-one without this experience should use either drug. The enthusiast, on the other hand, must not overstep the bounds of discretion in selecting cases for curarine lest the present boom be followed by a slump of discredit.

AN ANTI-HISTAMINE SUBSTANCE

THERE is evidence that many of the manifestations of anaphylactic or allergic reactions are due to the liberation of histamine in the body,[1] and various attempts have been made to produce substances which would prevent or antagonise the actions of histamine and thus relieve allergic symptoms. In 1930 Best and McHenry[2] described an enzyme which destroys histamine and which they called histaminase, though the name "diamine oxidase," subsequently suggested by Zeller,[3] is perhaps more correct, since it appears to act on a whole series of compounds. Therapeutic trials with this enzyme have been disappointing. Many other substances were tried, but in their review in 1932 Hill and Martin[4] concluded that none was really satisfactory for alleviating experimental anaphylactic shock in animals. In 1937 a systematic search for synthetic anti-histamine substances was started in France and led to the production of a number of active compounds.[5] The least toxic of these, N-dimethyl amino methyl-N-benzyl aniline, is usually referred to by the name "antergan" and has apparently been used with success in hay-fever, urticaria, serum-sickness, and other conditions.[6] Swiss workers have also reported on a series of derivatives of ethylene diamine which have a high anti-histamine activity in guineapigs.[7]

'Benadryl' (β-dimethyl amino ethyl benzhydryl ether hydrochloride) is one of a series of water-soluble compounds synthesised by Rieveschl and Huber and investigated by Loew and his colleagues[8] in the research laboratories of Parke, Davis and Co. Pharmacological studies on animals suggest that it has two main effects in relieving (1) the bronchial constriction caused by histamine or anaphylactic shock, and (2) the vasodepressor effects of histamine. Such effects could be produced by a variety of mechanisms, but recent studies[9] suggest that benadryl acts by competing directly with histamine for a given site of action or receptor—a relationship similar to that between sulphonamides and *p*-aminobenzoic acid. The toxicity of benadryl in animals is low, and repeated administration of non-lethal toxic doses to dogs over long periods does not affect the hæmopoietic system. Curtis and Owens[10] found a wide margin of safety when the drug was used in man.

These findings are confirmed and extended by a group of papers[11] which suggest that benadryl (not yet obtainable in this country) will become a drug of clinical importance. The most striking results have been in the control of symptoms associated with urticaria and hay-fever. In most cases, however, relief was obtained only while the drug was being used; hence it is palliative and not curative. In asthma, unfortunately, the results were not so good; only a minority of the few patients treated showed any favourable response, and in one case where the drug was injected intravenously on three occasions the symptoms were made worse. In some cases the secretion of hydrochloric acid in the stomach after the injection of histamine was appreciably reduced, though in others it was not altered at all. Further work on this point is necessary, since it may open up a new approach to the control of gastric acidity. Side effects were frequent but not sufficiently severe to warrant discontinuance of the treatment. Sleepiness, dizziness, dryness of the mouth, and a feeling of nervousness were the most important. Nausea and vomiting were occasionally troublesome. No blood changes were observed in patients receiving the drug.

In spite of the evidence of Dragstedt and his co-workers,[9] it is not yet certain that the conditions in which benadryl is clearly effective are produced by the action of histamine, though this seems the likeliest explanation.

BRITISH RESTAURANTS

ONE of the most successful achievements of the war has been the feeding of the nation. The Ministry of Food not only provided basic rations for all, without distinction of class, but also supplemented those rations for some of the people least able to help themselves to procure unrationed food—namely, children and low-income workers. School meals and industrial canteens, which were in existence before the war, needed only to be developed, but there were many other people to be helped during the emergencies which arose. During the intensive bombing of London in 1940 the Ministry of Food devised the British Restaurant service to meet this need, and so successfully that within four years there were 2000 of them all over the country, supplementing rationed diet to the extent of 4,000,000 main meals a week. These truly democratic institutions, run by the local authorities, provide a two (sometimes three) course meal at an average cost of 1*s.* 2*d.* This is good value; and the National Council of Social Service has made an inquiry,[12] drawing information from varied sources, as to whether the Government is justified in maintaining British Restaurants as permanent institutions, in face of the disapproval of the catering trade.

There are two main classes who will benefit most by the continuation of the British Restaurant, with its nourishing food and quick service on cafeteria lines—those who formerly brought a "packed" lunch but now have not the materials for sandwiches or pies; and those who used to go home for the midday meal but cannot now do so owing to transport difficulties or distance from work. Neither of these groups of workers can afford the prices at ordinary catering establishments, or the time spent in catching the waitress's eye. Naturally there are many others to whom the British Restaurant is a boon; for instance, students, working men in working clothes who feel they are looked at askance in more pretentious eating-houses, and elderly people who thus eke out their rations and also save the fatigue

1. Dragstedt, C. A. *Physiol. Rev.* 1941, **21**, 563. Code, C. F. *Ann. Allergy*, 1944, **2**, 457.
2. Best, C. H., McHenry, E. W. *J. Physiol.* 1930, **70**, 349.
3. Zeller, E. A. *Helv. chim. Acta*, 1938, **21**, 1645.
4. Hill, J., H., Martin, L. *Medicine, Baltimore*, 1932, **11**, 141.
5. Bovet, D., Staub, A. M. *C.R. Soc. Biol. Paris*, 1937, **124**, 547. Staub, A. M., Bovet, D. *Ibid*, 1937, **125**, 818.
6. Decourt, P. *Pr. méd.* 1943, **51**, 501.
7. Mazer, R. L., Huttrer, C. P., Scholz, C. R. *Science*, 1945, **102**, 93.
8. Loew, E. R., Kaiser, M. E., Moore, V. *J. Pharmacol.* 1945, **83**, 120.
9. Wells, J. A., Morris, H. C., Bull, H. B., Dragstedt, C. A. *Ibid*, 1945, **85**, 122.
10. Curtis, A. C., Owens, B. B. *Univ. Hosp. Bull., Ann. Arbor*, 1945, **11**, 25.
11. *Proc. Mayo Clin.* 1945, **20**, 417.
12. British Restaurants. An Inquiry made by The National Council of Social Service. London: Oxford University Press. Pp. 86. 3*s.* 6*d.*

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of cooking. Apart from the immediate value to health and digestion of eating a good hot meal with time to eat it, there is the further benefit of education in diet. The simplicity and cleanliness of these generally well-run establishments set a standard of meals not beyond the grasp of the average working-class housewife, whom the war has weaned perforce from the tin-opener. In addition, one of the lessons of evacuation was that many children from poor districts did not understand sitting down to a knife-and-fork meal, and to plates of meat and vegetables. It is all to the good that better food habits should become general. Many British Restaurants have experimented in introducing new food habits—e.g., by providing a well-balanced salad dish as the main portion of a meal. The retention of this service may well be one of the means of education in food values.

The war has taught all sections of the community to rub shoulders together amicably, and since the dawn of history men have recognised that sharing a meal draws them together in friendship. The British Restaurant has a social value in the part it plays in teaching this lesson of communal feeding. An analysis of samples of the customers of these restaurants in different places shows that, although a high proportion of them are industrial workers, many other working people frequent them, and "the clerk, the managing director and the local clergy, boilermaker, apprentice, and the schoolboy are all to be found in the same queue selecting their own food . . . and often obviously enjoying each other's company." All of us with a social conscience will wish for a continuance of this service with its possibilities of furthering the health, fitness, and democratic education of our citizens.

TOXICITY OF METHYL HALIDES

ALL methyl compounds are highly toxic. That methyl alcohol is a dangerous compound is well known, and the account of the manifestations of methyl mercury iodide poisoning by Hunter, Bomford, and Russell [1] attracted much attention in the early years of the war. Since then there have been many reports on the symptoms caused by exposure to the methyl halides. Methyl chloride, a colourless gas with a faint ether-like odour, was the first used on an extensive scale, being widely employed in refrigerators before the introduction of the freons. Kegel, McNally, and Pope [2] and Baker [3] published full clinical descriptions based on 126 cases of poisoning occurring among employees of an American firm of refrigerator manufacturers, while Jones [4] described 7 cases in travelling refrigerator repairers in England. In the mildest cases the patient complains of staggering gait, dizziness, and headache, followed by anorexia, nausea, and vomiting next day. In cases of moderate severity the illness may last several weeks and be accompanied by drowsiness, malaise, and weakness, with ocular symptoms in about half the cases. In severe poisoning epileptiform convulsions may lead to death. Involuntary movements, ptosis, strabismus, diplopia but not optic atrophy, slurred speech, amnesia, delirium, fever, oliguria, albuminuria, and anæmia are all reported; while sequelæ such as ataxia, diplopia, misty vision, headache, drowsiness, and amnesia sometimes persist for as long as eight months.

Only two cases of methyl iodide poisoning have been reported, since this halide, a colourless acrid lacrimatory liquid, is not much used in industry. The first case, described in 1901 by Jaquet,[5] was in a man of 30 who developed vertigo, diplopia, ataxia, and mental symptoms from which he never recovered sufficiently to resume his normal work. The second case was reported last year by Garland and Camps,[6] in a chemical worker of 38 who developed giddiness, sleepiness, diarrhœa, and mental irritability and died five days after admission to hospital. Necropsy revealed no striking abnormality, but chemical examination of his brain yielded 6 mg. of combined iodine.

Methyl bromide is at present much the most important of this group of halides. It is a colourless liquid, with a slight smell of chloroform, that boils at 4·5° C to form a gas 3½ times as heavy as air. Because of its weight it has been widely used as a fire-extinguisher. It is very effective against fires involving high octane aviation spirit and was therefore adopted by the Royal Navy in motor torpedo-boats. The chemical industry use it in preparing methyl compounds and in making colours from methylated tar. It is a potent insecticide and is used to protect a wide variety of foods, grain, plants, and textiles. Entomologists like it for pest control because it leaves no smell or taste and is not explosive. It is highly toxic to insects such as lice, bedbugs, and weevils in all stages of their development, and is inexpensive. Substances which kill insects are nearly always toxic to man and methyl bromide is no exception. Numerous cases of poisoning have been reported, and in the last four years there have been examples in France,[7] Canada,[8] and the United States,[9] as well as in Britain.[10 11 12] It produces three distinct groups of symptoms—pure gassing, the systemic effects of the vapour, and local effects on skin and mucous membranes. In gassing, death may result from anoxæmia or toxic paralysis of the respiratory centre. Systemic effects include headache, giddiness, numbness, fits, diplopia, inability to accommodate, and vomiting, while the more severe symptoms are similar to those of alcoholic intoxication with disorders of gait and coördination. The bromine level in blood and cerebrospinal fluid is always raised. Sleeplessness and depression are frequent sequelæ. Death, when it occurs, results from pulmonary œdema, necropsy showing acute purulent bronchitis, inflammation and œdema of the lungs, fatty degeneration of the ganglion cells of the brain, and degenerative changes in the kidneys. The local signs consist of erythema, œdema, and enormous blisters containing sterile fluid—a chemical burn which does not penetrate the complete thickness of the skin. Methyl bromide will rapidly penetrate clothing, including leather and rubber, and Butler, Perry, and Williams [13] gave an account of severe burns in soldiers caused by the substance when used to put out a fire in an armoured car; here the methyl bromide went through Army boots and anklets.

Animal work done in the United States [14] has demonstrated that methyl bromide is by far the most toxic of the four organic halides—methyl bromide, methyl chloride, ethyl bromide, and ethyl chloride. Small concentrations in these animals produced symptoms and changes similar to those described for man, and larger

1. Hunter, D., Bomford, R. R., Russell, D. S. *Quart. J. Med.* 1940, 9, 193.
2. Kegel, A. H., McNally, W. D., Pope, A. S. *J. Amer. med. Ass.* 1929, 93, 353.
3. Baker, H. M. *Ibid*, 1927, 88, 1137; *Amer. J. publ. Hlth*, 1930, 20, 291.
4. Jones, A. M. *Quart. J. Med.* 1942, 11, 29.
5. Jaquet, A. *Disch. Arch. klin. Med.* 1901, 71, 370.
6. Garland, A., Camps, F. E. *Brit. J. indust. Med.* 1945, 2, 209.
7. Duvoir, L., Derobert, L. *Arch. Mal. profess.* 1945, 6, 149. Michaux, J., Clercy, A., Lechevallier, G. *Ibid*, 1945, 6, 143.
8. Viner, N. *Canad. med. Ass. J.* 1945, 53, 43.
9. Watrous, R. M. *Indust. Med.* 1942, 11, 575. Miller, J. W. *Arch. Path.* 1943, 36, 506. De Jong, R. N. *J. Amer. med. Ass.* 1944, 125, 702. Heimann, H. *Indust. Bull.* 1944, 23, 103.
10. Gray, P. H. K. *J.R. nav. med. Serv.* 1944, 30, 214. Holling, H. E., Clarke, C. A. *Ibid*, 1944, 30, 218.
11. Clarke, C. A., Roworth, C. G., Holling, H. E. *Brit. J. indust. Med.* 1945, 2, 17.
12. Wyers, H. *Ibid*, 1945, 2, 24. Carter, A. B. *Brit. med. J.* 1945, 1, 43.
13. Butler, E. C. B., Perry, K. M. A., Williams, J. R. F. *Brit. J. indust. Med.* 1945, 2, 30.
14. Sayers, R. R., Yant, W. P., Thomas, B. G. H., Berger, L. B. *Publ. Hlth Bull., Wash.* 1929, no. 185. Irish, D. D., Adams, E. M., Spencer, H. C., Rowe, V. K. *J. indust. Hyg.* 1940, 22, 218; *Ibid*, 1941, 23, 408.

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doses produced pulmonary œdema and bronchopneumonia. In view of idiosyncrasy, it is never possible to establish a safe concentration for man, but it is usually assumed that 70 parts per million would be the upper safety limit for short exposures and 50 parts per million for exposures lasting over eight hours. Once poisoning has occurred, treatment, apart from removing the patient from exposure, is of little value; therefore attention should be directed to preventive measures. Methyl bromide is capable of passing a Service gas mask in a quarter of an hour, and Clarke, Roworth, and Holling [11] therefore suggested that a pungent substance should be added to draw attention to its presence; Viner [8] mentioned that it can be mixed with 20% carbon tetrachloride, but phosgene may then be formed when the mixture is put on a fire. Fire-fighters should be warned against spilling the substance on their clothing and instructed that clothing wetted with it must be removed immediately. Ships, storehouses, and barns must be thoroughly ventilated after it has been used for fumigation. Prevention of leaks, adequate dilution of escaping gas, and exhaust ventilation through the floor of the workshop are the most important preventive measures in industry. Bathing the hands in a weak solution of sodium carbonate may help to prevent skin lesions by decomposing the methyl bromide. Periodic medical examination will not only detect early symptoms but draw attention to dangerous mechanical parts and lead to their repair before serious trouble has arisen.

STATISTICS AND EPIDEMIOLOGY

AT a meeting of the Royal Statistical Society on Feb. 27, Dr. Major Greenwood, F.R.S., emeritus professor of vital statistics and epidemiology at the London School of Hygiene and Tropical Medicine, discussed the part which statistical methods could play in the study of epidemic disease. After referring to the history of ideas on the nature and mode of spread of epidemics, he gave a neat example of the fitting of an algebraic structure to the hypothesis of the patient-to-patient transmission of measles. A cynic, as Professor Greenwood noted, might observe that the mathematical ingenuity of his proof was rather wasted on the verification of a result which should be self-evident to any mother with more than two children. On the other hand, the epidemic nature of influenza was not self-evident even to so distinguished a medical historian as Hirsch writing little more than 60 years ago. Truth, as Pontius Pilate inferred, is relative, and proof in the strict sense is seldom possible in the biological sciences. The value of statistical methods seems to lie in the rigorous testing of a hypothesis—it deals not with absolute proofs but with relative likelihoods. In practice, Professor Greenwood suggested, the methods which seemed almost superfluous when applied to measles can be profitably used in the study of such baffling problems as the spread of epidemic poliomyelitis. Essentially, these methods consist in an analysis of the time intervals between successive cases and a study of the departures of these intervals from a purely chance variability—a problem of some mathematical complexity.

Much has been done by medical statisticians in an effort to uncover the "laws" of the waxing and waning of epidemics. The explosive outburst of a food-borne disease is evident in the skewed shape of the epidemic curve which results from the sudden initial rise in the number of cases. Conversely, the more even rise and fall of an influenza epidemic is indicative of its airborne spread from person to person. Farr, Brownlee, Ross, and McKendrick have all tried to generalise in mathematical form the rise and fall of epidemic disease. Ross and McKendrick have stressed the effects of the influx of non-immunes into the herd and the development of herd immunity. Brownlee, from the statistical characteristics of the epidemic curve, suggested a possible waning of the invasive power of the infecting organism itself from the very start of the epidemic. Epidemics, in fact, did not decline only because all the susceptible had either succumbed or acquired immunity, but also because the organism itself had become less invasive. This view was at least partly vindicated by the experimental studies of Greenwood and Topley on epidemics in mice.

Professor Greenwood ended with an appeal to mathematical statisticians. The medical and biological complexities of the study of epidemics had added fresh variables which must be accounted for in the algebraic formulations of epidemic laws. Such formulations called for a mathematical sophistication which few in the medical profession could hope to attain, but in coöperation between statisticians and field epidemiologists lay the future promise.

FOLIC ACID AGAIN

LAST year chemists in the United States [1] synthesised a substance with similar properties to the folic acid, or "*L. casei*," factor, which had been isolated from liver, and Spies and his colleagues claimed that this material effectively relieved nutritional macrocytic anæmia. These claims have now been considerably extended. Darby, Jones, and Johnson [2] gave synthetic folic acid in a dose of 15 mg. intramuscularly daily to 3 cases of sprue, with no other treatment. The cases presented all the classical features—glossitis, loss of weight, diarrhœa with increased fat in the stools, flat glucose-tolerance curve, macrocytic anæmia, and sternal marrow like that of untreated pernicious anæmia. In all 3 cases there was a rapid remission of all symptoms with a notable reticulocyte response, and the sternal marrow showed disappearance of the more primitive erythroblasts. Spies [3] has claimed a satisfactory response to folic acid in 5 cases of Addisonian pernicious anæmia, 8 cases of sprue, and 3 of macrocytic anæmia of pregnancy, and others in addition; but he gives no details.

These findings are important and surprising. It was to be expected that, sooner or later, the vitamin-B factor that relieved nutritional macrocytic anæmia would be isolated; but that the same factor should be effective in true pernicious anæmia and relieve all the varied symptoms of sprue is unexpected. Workers on nutritional anæmia elsewhere than America, such as Wills in India and Trowell in Uganda, have found that the purified liver extracts which are effective in pernicious anæmia had to be given in very large doses to produce any effect in nutritional macrocytic anæmia—in doses much larger than those of crude liver concentrates, which suggested that the factors responsible were different. So far only preliminary reports have appeared, but fuller information should soon be available. We need to know the chemical constitution of synthetic folic acid, and we need fully illustrated clinical records that will show clearly that folic acid brings about a change from megaloblastic to normoblastic marrow in cases of true pernicious anæmia and the megaloblastic nutritional anæmias; for, if these claims are confirmed, all present liver extracts are out of date.

THE Rockefeller Foundation has made to the Tavistock Clinic in London a grant of £22,000 for practical work in such problems as industrial relations, resettlement of returning Servicemen, and the current difficulties of families and communities in the reconstruction period. Two anonymous donors have added £3500 to the fund. This work will form the main task of a new organisation, the Tavistock Institute of Human Relations.

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1. See *Lancet*, Dec. 29, 1945, p. 855.
2. Darby, W. J., Jones, E., Johnson, H. C. *Science*, Jan. 25, 1946, p. 108.
3. Spies, T. D. *Lancet*, Feb. 16, 1946, p. 225.

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Reconstruction

NATIONAL HEALTH SERVICE BILL

A SUMMARY *

THE Bill provides for the following kinds of health services:

(i) *Hospital and specialist services*, including mental hospitals, sanatoria, maternity accommodation, treatment during convalescence, medical rehabilitation, and other institutional treatment. These cover inpatient and outpatient services, the latter including clinics and dispensaries operated as part of any specialist service. The advice and services of specialists of all kinds are also to be made available, where necessary, at health centres and in the patient's home.

(ii) *Health centres and general-practitioner services*—i.e., general personal health care by doctors and dentists whom the patient chooses. These personal practitioner services are to be available both from new publicly equipped health centres and from the practitioners' own surgeries.

(iii) *Various supplementary services*, including midwifery, maternity and child welfare, health visiting, home-nursing, a priority dental service for children and expectant and nursing mothers, domestic help where needed on health grounds, vaccination and immunisation against infectious diseases, additional special care and aftercare in cases of illness, ambulance services, blood-transfusion, and laboratory services.

(iv) The *provision of spectacles, dentures, and other appliances*, together with drugs and medicines—at hospitals, health centres, clinics, pharmacists' shops, and elsewhere.

All the service, or any part of it, is to be available to everyone in England and Wales, without limitations based on financial means, age, sex, employment or vocation, or area of residence. The various benefits are not conditional upon any insurance qualification or the proof of having paid contributions. There are no waiting or qualifying periods.

The service is to be available from a date to be declared by Order in Council, and it is hoped that this will be at the beginning of 1948. It is to be financed partly from the Exchequer, partly from local rates, and partly from National Insurance contributions. There are to be no fees or charges to the patient, with the following exceptions:

(i) Some charges for the renewal or repair of spectacles, dentures, and other appliances, made necessary through negligence in their care.

(ii) Charges (taking into account ability to pay) for the provision of domestic help under the Bill and for certain goods or articles (e.g., supplementary foods, blankets) provided in connexion with maternity and child welfare or the special care or aftercare of the sick.

(iii) It will be open to people if they wish, in certain cases, to pay for additional amenities—e.g., articles or appliances of higher cost than those normally made available, or private rooms in hospitals (which they will nevertheless be able to obtain free where privacy is medically necessary).

The Bill places a general duty upon the Minister of Health to promote a comprehensive health service for the improvement of the physical and mental health of the people, and for the prevention, diagnosis, and treatment of illness. It transfers to him the present administrative functions of the Board of Control, which retains only its quasi-judicial functions.

* Abridged from the white-paper containing a factual account of the Bill laid before Parliament this week. This relates only to England and Wales, and a further Bill providing for Scotland will be introduced later.

The Minister will discharge his general responsibility through three main channels:—

(*a*) For parts of the service to be organised on a new national or regional basis—i.e., hospital and specialist services, blood-transfusion, and bacteriological laboratories for the control of epidemics—he is to assume direct responsibility. But he is to entrust the actual administration of the hospital and specialist services to new regional and local bodies, which are to act on his behalf in suitable areas to be prescribed by him, and are to include people of practical experience and local knowledge and some with professional qualifications. Special provision is made for hospitals which are the centres of medical and dental teaching.

(*b*) For parts of the service to be organised as a function of local government—i.e., the provision of new health-centre premises and a variety of local domiciliary and clinic services—direct esponsibility is put upon the major local authorities, the county and county-borough councils. Their general arrangements for these local services are made subject to the Minister's approval.

(*c*) For the personal practitioner services both in the health centres and outside—i.e., the family doctor and dentist and the pharmacist—new local executive councils are created. Half the members of each council will be nominated by the local professional practitioners concerned. There will normally be an executive council for the area of each major local authority, and they will work within national regulations.

By the Minister's side, to provide him with professional and technical guidance, there is to be a Central Health Services Council composed of doctors, dentists, nurses, and other professional people concerned with the different parts of the service, together with people having experience of hospital management, of local government, and of mental-health services—all appointed by the Minister in their individual capacities but after consultation with the appropriate representative organisations. The presidents or chairmen of six of the principal medical bodies in the country are also to serve on the council, ex officio. The council will be free to advise the Minister of its own initiative; it will report annually to him, and he will lay the report before Parliament unless he is satisfied that publication would be contrary to the public interest. He is empowered also to constitute standing advisory committees, which, though not specified in the Bill, will in fact cover such subjects as medical aspects of the service, mental health, dentistry, nursing, and pharmacy. They will deal with questions referred to them either by the Minister or by the council and will have direct access to the Minister as well as to the council.

Hospital and Specialist Service

This part of the service covers hospital and consultant services of all kinds.

The existing premises and equipment of voluntary and public hospitals are transferred to the Minister, and he is empowered also to acquire by purchase other hospitals and their equipment which may be required for the service. If he is satisfied that the transfer of a particular hospital is not in fact necessary for the new service he can—with that institution's concurrence—except it from transfer. The general transfer includes the present mental hospitals and mental-deficiency institutions.

The endowments of voluntary teaching hospitals—defined to mean, broadly, all their property other than buildings and their contents—will pass, not to the Minister, but directly to the new boards of governors, who are to be free to use them as they think best but are required, so far as practicable, to see that the purposes for which they were previously usable are still observed. The endowments of other voluntary hospitals are to pass to a new Hospital Endowment Fund.

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After this fund has met the debts and liabilities attaching to the voluntary hospitals concerned, its capital value will be apportioned among the several regional hospital boards. The income of each portion will then pass automatically to each board, which will be generally free to use it as it wishes. Any board will be able also at any time to draw on its portion of the capital for any purpose which the Minister approves.

The boards—and the boards of governors of teaching hospitals—will be fully able to receive gifts or legacies, and to hold any property on trust, for any purposes connected with the hospital or health services.

HOSPITAL ADMINISTRATION

The Minister is to entrust the future administration of all the hospitals (other than teaching hospitals) to regional hospital boards. Each hospital-service region will be such that its services can conveniently be associated with a university medical school, and there will probably be between 16 and 20. The 20 boards will be composed of people chosen and appointed by the Minister for their individual suitability for the task; but before making the appointments the Minister is to consult any university with a medical school in the region, bodies representative of the medical profession, the local health authorities of the area, and others concerned, including, initially, those with experience of the voluntary-hospital system. The boards are to include members with experience of the mental-health services.

Each board will appoint local hospital management committees, one for each large hospital or related group of hospitals forming a reasonably self-contained hospital-service unit. Each of these committees will contain members appointed after consulting the major local authorities in its area, the executive councils for the general-practitioner services in its area, the senior medical and dental staff of the hospitals concerned, and others, including those with experience in voluntary hospitals.

The regional boards will undertake the general administration of the hospital and specialist services in their regions. With the Minister, and in collaboration with the teaching hospitals, each board will plan, and execute the plan for, a coördinated hospital and specialist service for its region. The management committees will carry out day-to-day management of the hospitals under their control. They are to be the local managing bodies on the spot, and will, for example, appoint nursing and other general staff (appointing them as employees of the regional boards). They will be able, as required, to set up small house-committees for any individual hospitals within their care.

It is intended that the regional boards, with their local management committees, shall enjoy a high degree of independence and autonomy within their own fields. Their use of existing voluntary-hospital endowments has already been described. For the general financing of their hospital services, however, they will look to the Exchequer, and they will be given as much financial freedom—by a system of block annual budgets or otherwise—for local initiative and variety of enterprise as general principles of Exchequer responsibility allow.

TEACHING HOSPITALS AND SCHOOLS

Special arrangements are made for teaching hospitals—i.e., hospitals or groups of related hospitals designated by the Minister as providing the facilities for undergraduate or postgraduate clinical teaching. These will enable any hospital or group of hospitals to attain teaching status.

The general system of regional boards and management committees will not cover the teaching hospitals. The Minister is to constitute for each such hospital or group of hospitals its own separate board of governors, including members nominated by the university, the regional board for the area, and the senior staff of the hospital itself, and members appointed after consultation with the major local authorities and other organisations concerned, including the previous governing bodies. The board of governors of a teaching hospital will be responsible generally for administering their hospital on the Minister's behalf.

The financial arrangements in regard to existing endowments have already been described. For the general financing of their services they will look to the Exchequer, and again the general object will be to assure them all the financial freedom and autonomy of management which the general conception of a nationally reorganised and nationally financed service makes possible. In this case, in addition, it is intended to keep in the forefront of any arrangements the special position of these hospitals as the centres of clinical teaching and technical experiment and innovation.

The fact that special administrative and financial arrangements may be made for teaching hospitals does not mean, however, that these hospitals are not to form an integral part of the hospital service as a whole. They will be joined with the Minister and the regional boards in the general planning and arrangement of the hospital services of each region, and the regional boards will be represented on their boards of governors.

Neither medical and dental schools, nor any of their property, are to be transferred to the Minister or to the board of governors of the teaching hospital with which they are associated. These schools will continue to be owned and administered, in London, by their own governing bodies, and elsewhere by the universities of which they form part; and the Bill provides for the transfer of any existing hospital property held for school purposes to these governing bodies.

HOSPITAL STAFFS

The staff of all hospitals will be employed by the regional boards or by the boards of governors of teaching hospitals. Specialists taking part in the service, whole-time or part-time, will be attached to the staff of hospitals. Part-time participation in the service will not debar them from continuing private practice.

In appointing senior medical or dental staff to their hospitals the regional board, or the board of governors, are to advertise vacancies and to constitute an expert advisory appointments committee. This will draw up a list of applicants suitable by qualification and experience for the vacancy, and the board will make the appointment from that list.

The boards will determine the terms of engagement of all their staff, but the Minister is empowered to make regulations governing the qualifications, conditions of service, and remuneration of the staff of this or any other part of the health service. Before making regulations he will consult appropriate organisations. Existing hospital officers employed on a paid whole-time basis are to be protected, either by being transferred to the new bodies or by compensation if they are not transferred or are re-employed on less favourable terms.

PAY-BED ACCOMMODATION

Where there are single bedrooms or small wards in hospitals the Minister can make them available to patients who wish to buy greater privacy by paying the extra cost—subject always to the requirements of patients who need such accommodation on medical grounds, who will be able to have it without payment. In addition, the Minister may provide separate pay-bedrooms or blocks for which people can pay the whole cost privately and in which specialists within the service can treat private patients. This is subject to his deciding that it is reasonable in the particular hospital to provide such private accommodation, having regard to the needs of the general service, and it is also subject to the overriding right of other patients to be admitted to these rooms or blocks, without payment, if medical considerations urgently require it. Private patients using the accommodation will pay their own specialists' fees, but the Bill enables the Minister to limit the fees charged.

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RESEARCH

The Minister is expressly empowered to conduct research and to give financial help to voluntary agencies so doing. Boards of governors of teaching hospitals and regional boards will also be able to conduct research.

General-practitioner Services

The personal health services provided by general practitioners and dentists, and the supply of drugs, medicines, and appliances, will be arranged by the local executive councils established in the area of each county and county borough. As already explained, half of each council will be professional—appointed by the local doctors, dentists, and chemists through their representative committees in the area—while the other half will be appointed partly by the local county or county-borough council (a third of the council) and partly by the Minister (a sixth). The chairman will be appointed by the Minister. Single executive councils may be established for the areas of two or more authorities.

HEALTH CENTRES

A main feature of the personal practitioner services is to be the development of health centres. The object is that the health-centre system, based on premises technically equipped and staffed at public cost, shall afford facilities both for the general medical and dental services and for many of the special clinic services of the local health authorities, and sometimes also for outpost clinics of the hospital and specialist services. They will likewise be able to serve as bases for health education.

The Bill makes it the duty of the county and county-borough councils to provide, equip, staff, and maintain the new health centres to the satisfaction of the Minister. The local authorities will directly administer such of their own local clinic facilities as they may provide in the centres. But doctors and dentists who use the new centres will be in contract only with the executive council, and it will be for the council to arrange with the local authority for their use of the centre's facilities. For doctors in the general-practitioner service the centres will take the place of their own surgeries, and the doctors' responsibilities to patients on their personal lists—e.g., in visiting their patients' homes and in general responsibility for their patients at all times—are not affected by whether they practise from a health centre or not.

FAMILY-DOCTOR SERVICE

All doctors are to be entitled to take part in the new arrangements in the areas where they are already practising when the scheme begins. Taking part will not debar them from making private arrangements for treating such persons as still wish to be treated outside the service, provided that these are not on their lists as public patients or on the lists of their partners in a health centre. People will be free to choose their own doctor subject to the doctor's consenting and being in a position to undertake their care.

All doctors entering this part of the new service will be in contract with the executive council for the area in which they practise. The council will draw up and publish lists of all practitioners who wish to participate. People will then choose their doctor, and each doctor will have his own list of the people whom he has agreed to attend. There will be machinery for allocating among the doctors concerned such people as wish to take advantage of the service but have not chosen a doctor for themselves or have been refused by the doctor chosen by them. The relationship of the doctor with any person on his list will then be similar to the ordinary relationship of doctor to patient as it is now known, except that the doctor's remuneration will come from public funds and not directly from the patient.

The Bill itself does not determine the detailed terms and conditions for doctors joining in the service, or the doctors' remuneration. These are left to be settled by regulations, which will be made in consultation with representatives of the profession. It is, however, the intention that remuneration should take the form of a combination of fixed part-salary and of capitation fees, the latter varying with the number of persons whose care is undertaken by each doctor and diminishing in scale as the total number of patients rises. Variations of the fixed part-salary will be possible so as to take account of different circumstances and experience, and the differing conditions of practice in particular areas. A contributory superannuation scheme will be instituted.

Actual rates of remuneration for doctors can be determined, in consultation with the profession, only after the report has been received of the Spens Committee—the committee set up under the chairmanship of Sir Will Spens, with a membership half medical and half non-medical, to make an independent report on the appropriate range of remuneration for doctors taking part in a publicly organised service of this kind.

DISTRIBUTION OF MEDICAL PRACTICES

To help in meeting the needs of under-doctored areas it is intended to adjust the scales of remuneration of doctors so as to offer additional inducement to practise in less attractive areas. In addition, a Medical Practices Committee, mainly professional in composition, is to be appointed to regulate in future the succession to old, or the opening of new, practices within the service.

To begin with, an appointed day will be fixed and all doctors then in practice will have the right to have their names included on the lists drawn up by the executive councils for the areas in which they work. After the appointed day any doctor who wishes either to join the public service for the first time, or to practise in a new area, will need the consent of the Medical Practices Committee. Normally, he will ask to have his name included in the list of the executive council for the area of his choice, and that council will inform the committee. The committee may consent either unconditionally or subject to a condition as to the general part of an executive council's area in which he practises. They will not be able to withhold consent on any ground except that there are already enough doctors practising in the public service in the area in question. If, when a practice becomes vacant in a particular area, there is more than one applicant for taking it over, the committee will decide to which doctor the necessary consent is to be given. A doctor whose application to practise in a particular area is refused, or granted subject to conditions, can appeal to the Minister.

SALE OF PRACTICES AND COMPENSATION

The above control of succession to, or opening of, practices will apply to all practices which are wholly or partly within the service. It will make the sale of their goodwill inappropriate, and the Bill provides for the prohibition of the sale of such practices in future and for compensation to existing practitioners. Those who join in the public service at the outset will be entitled to compensation in respect of loss through being unable thereafter to sell their practices. In addition, any doctor who dies or retires from practice between the passing of the Act and the appointed day, and whose practice has not been sold in the meantime, will qualify for compensation. If he is compensated, his practice will be regarded as having come within the service at the appointed day.

The total amount of compensation to be made available to the profession under the Bill is a sum of £66 million for England and Wales and Scotland. Provision is made for this sum to be reduced if the number of practitioners taking part in the service falls substantially short of what is expected. Its apportionment among the individual doctors will be left in the main to the profession itself. Normally compensation is to be payable on the retirement or death of a doctor, but earlier payment will be arranged where hardship (e.g., through outstanding debts) would otherwise arise. In the meantime

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interest on the compensation due is to be paid each year to the doctor at the rate of 2¾% per annum.

DOCTORS AND THE HEALTH CENTRES

As and where health centres are developed, the doctors in the area will be able, if they wish, to use the consulting-rooms and other facilities so provided in place of their present surgeries, so far as they are participating in the new service. Any group of doctors joining in practice from a health centre, however, will be encouraged—wherever possible—to enter into a partnership arrangement whereby their joint remuneration within the service is divided among them on some agreed basis.

PHARMACISTS

Every properly qualified pharmacist will have the right to join in the new service. The executive council in each area will publish a list of those who join, and patients will be able to obtain their supplies on the prescription of their doctor either from the premises of a pharmacist or from any health centre where dispensing services are provided. Drugs, medicines, and appliances required for hospital purposes will be supplied as part of the hospital service.

DENTAL SERVICE

The arrangements proposed for dental services will be rather different from those of the family-doctor service. Priority will be given to expectant mothers and young people. This is to be done through the local health authority's maternity and child-welfare service and through the school health services under the Education Act, 1944. Outside the priority arrangements a general dental service will be made available, but there will not at first be any guarantee that everyone will be able to obtain full dental care without waiting. All dentists who wish to participate in the general dental service will have the right to do so, and the executive council in each area will publish a list of them.

The object will be to develop general dental services in the health centres, or corresponding dental centres, as much and as quickly as possible. In the centres dentists will be able to participate either whole-time or part-time and will be remunerated by salary for the time which they give to the new service. Outside the centres it will be open to anyone to arrange with any dentist in his own surgery who agrees to undertake his or her dental care. The dentist will normally be able to start treatment and subsequently submit a claim for payment from public funds. For certain forms of treatment, however, he will submit an estimate to a new professional body established by the Bill—the Dental Estimates Board. This will have branch offices in different parts of the country whose function it will be to approve dentists' estimates for treatment to be given or appliances to be supplied. The dentist will be paid by the executive council in accordance with a prescribed scale of fees, or in some cases on special estimates by the board.

The general range of remuneration of dentists is to be settled in the light of the findings of a committee established on lines similar to the Spens Committee. Dentists taking part in the general dental service will not be debarred from treating under private arrangements anyone who does not wish to make use of the service.

EYE SERVICES

The object is to secure that the care of the eyes, with sight-testing and the supply of spectacles, is carried out—as rapidly as resources allow—in special ophthalmic departments and clinics forming part of the hospital and specialist service. These clinics will be in charge of specialist medical ophthalmologists, and in them the qualified sight-testing opticians will also play their proper professional part. Spectacles will be obtainable either at the clinics themselves or at the premises of dispensing opticians taking part in the service.

While this full eye-clinic system is developing, however, a supplementary eye service is to be arranged by the executive councils in each area. Their arrangements are to be made with suitably qualified general medical practitioners, sight-testing opticians, and dispensing opticians who undertake the supply of spectacles. All the arrangements are to be entrusted by each executive council to a special committee—an Ophthalmic Services Committee—which will publish lists of the medical practitioners and opticians who have the necessary qualifications and who wish to participate in the service. The patient will then have freedom of choice among these doctors and opticians.

MISCELLANEOUS

Hearing of charges.—A special tribunal is to be set up to investigate cases where it is claimed that the continued inclusion of any doctor, chemist, dentist, or optician in the lists of an executive council would prejudice the efficiency of the service. This tribunal will have a legal chairman appointed by the Lord Chancellor and will in each case include a member of the same profession as the person whose case is being investigated, and one other—the latter two being appointed by the Minister. Where the executive council is directed to remove the name from its list, the person concerned will be able to appeal to the Minister. Where the tribunal so decides, a similar direction can be applied to all lists in all areas, with the same right of appeal.

Doctors, dentists, chemists, and opticians at present disqualified from participation in the National Health Insurance service will not have the right to participate in the new service.

Inadequate services.—Where the Minister is satisfied that the services provided by doctors, dentists, or chemists in any particular area are not adequate he may take such steps as he considers necessary to secure an adequate service.

Refresher courses.—The Minister is empowered to arrange with universities and medical and dental schools for the provision of refresher courses for doctors and dentists in the service, to contribute towards their cost, and to pay the expenses of those attending them.

Local-government Services

This part of the health service comprises the local and domiciliary services which are considered appropriate to local government rather than to central government or to any specially devised machinery. The Bill unifies these services in the existing major local authorities—the county and county-borough councils—and provides for the formation of joint boards wherever, exceptionally, this may be found desirable.

For most of these services the Bill requires the local health authorities (as they are to be called) to indicate to the Minister how they intend to carry out their responsibilities, and it requires the Minister's general approval. Their proposals are to be made known also to the regional boards and boards of governors for the hospital service, to the executive councils for the general-practitioner services, and to any voluntary organisation which is working in the same field in the area. The purpose of this requirement is to ensure that these local arrangements are fitted appropriately to the hospital and specialist services, for which the Minister is more directly responsible, and to the general-practitioner services which will be operated within his general regulations and control.

Interrelation between the different arms of the health service is reinforced by the provision for the local health authorities to nominate a third of the members of the executive councils for the general-practitioner services and to be consulted by the Minister in the appointment of regional boards, management committees, and boards of governors in the hospital and specialist services. It will also be reinforced by the personal contacts of the local medical officers of health and the principal medical and other officers of the other bodies, and by various practical devices such as the establishment of local

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coördinating committees of medical and other officers and by the use, wherever feasible, of common employment by different bodies of the same part-time staff.

MATERNITY AND CHILD WELFARE AND MIDWIFERY

Every local health authority will have to arrange for the care of expectant and nursing mothers and of children under five years of age who are not attending school. The arrangements will include antenatal clinics, postnatal and child clinics, the provision of cod-liver oil, fruit juices and other dietary supplements, and in particular a priority dental service for expectant and nursing mothers and young children. The Bill transfers these functions from such of the present "minor" authorities —the non-county boroughs and the district councils—as are now exercising them. But provision is made for delegating child welfare to "district executives" as is done for the school health service under the Education Act.

The county and county-borough councils are also to be the supervising authorities for the Midwives Acts—i.e., they are made responsible for a complete midwifery service for mothers who are confined at home. The midwives are to be employed either by the local health authority itself or by voluntary organisations with whom it comes to an arrangement. Attendance at the confinement is not to be the general duty of the doctor within the general-practitioner service, but the midwife will have the usual right—and duty—to call in a suitably qualified doctor in case of need. The general practitioner's services will nevertheless be available to the extent of general advice and health care to a woman before and after confinement, as at any other time.

Mothers who for any reason have their confinements in a hospital or maternity home will be in the care of the hospital and specialist service. It will also be the object of that service to provide locally for all specialist obstetric or gynæcological care which may be needed in relation to the ordinary domiciliary service of the local authority. The requirement of Ministerial approval of the local authority's arrangements will link the two aspects of the maternity service—domiciliary and institutional.

AID FOR THE HOME

Health visiting and home nursing.—A full health-visitor service will be provided by the local health authority for the sick, for expectant mothers, or for those with the care of young children. This widens the present conception of health visiting (as concerned with mothers and children) into a more general service of advice to households where there is sickness or where help of a preventive character may be needed. It is also made the duty of the local health authority to provide a nursing service for those who, for good reason, need nursing in their own homes. In both these activities the authority can, if it likes and if the Minister approves, make all or part of its provision by arrangement with voluntary organisations.

Care and aftercare of the sick.—Local health authorities are given a new power, and duty where the Minister so requires, to arrange for the prevention of illness and the care and aftercare of the sick. This can include such things as the provision of special foods, blankets, extra comforts, and special accommodation for invalids and convalescents, and the making of grants to voluntary organisations doing work of this kind; but it expressly excludes cash allowances to individuals or families, which is the function of National Insurance. A charge may be made.

Domestic help.—Under the present law local authorities are empowered to provide home helps as part of their maternity and child-welfare functions, and during the war this power has been extended temporarily to enable them to provide domestic help in a wider range of circumstances. The Bill makes this power permanent and extends it to cover the provision of domestic help, subject to the Minister's approval, to any household needing it on grounds of ill-health, maternity, age, or the welfare of children. Here again the local health authority will be allowed to make a charge.

LOCAL MENTAL-HEALTH SERVICES

The main mental-treatment and mental-deficiency services are to be part of the new hospital and specialist arrangements. Local health authorities, however, are given responsibility for all the ordinary local community care in the mental-health service—i.e., the ascertainment of mental defectives and their supervision when they are living in the community. This part of the service covers also the initial proceedings for placing patients under care under the Lunacy and Mental Treatment Acts.

VACCINATION AND IMMUNISATION

Compulsory vaccination is to be abolished, but it is to be the duty of the local health authority to provide free vaccination against smallpox and immunisation against diphtheria for anyone desiring them. This service the authority will provide by making arrangements with doctors who are taking part in the general-practitioner service—paying fees to those who undertake it. The vaccines, sera, or other preparations required may be supplied without charge by the Minister to local health authorities and doctors, and the service may be extended to cover immunisation against other diseases.

AMBULANCES

Apart from vehicles which may be needed as part of the hospital service, the provision of the main ambulances and hospital transport required for the health service becomes the duty of the local health authorities, either directly or by arrangement with voluntary organisations. In future the local authority's ambulances may—and must, if necessary—operate outside their own area.

HEALTH COMMITTEES

Local health authorities will have to appoint statutory health committees (comparable in many ways to their statutory education committees) and to refer to them all matters relating to the discharge of their functions under the Bill. The health committees may be authorised to exercise functions on behalf of their parent authorities, and there is discretion to coöpt expert members who are not members of the authority itself.

FINANCE

The Exchequer will bear the cost of the hospital, specialist, and other centrally organised services, the cost of the family-practitioner services, and half the cost of the local health authority services, together with the cost of central administration.

COMPENSATION FOR PRACTICES

THE following letter was addressed to the Minister of Health on March 8 by Dr. Charles Hill, secretary of the British Medical Association.

Dear Mr. Bevan,—The Compensation Sub-Committee of the Negotiating Committee has entered into discussions with the Ministry on the question of compensation, without accepting the policy from which the necessity for compensation arises. The medical profession is in no way committed to the policy of abolishing the custom of buying and selling goodwill. Indeed it has in the past expressed its opposition to this policy.

Important principles affecting the freedom of the medical profession are involved and the amount of money offered by the Government in compensation is irrelevant. The Government's proposals must be considered as a whole and not merely in terms of finance.

The view of the sub-committee is that if the Government persists in this policy, and Parliament approves, then the sum of £66,000,000 which the Government, after negotiations with the sub-committee, now offers may, on the evidence available, be taken to represent the aggregate capital loss involved in respect of the goodwill of general practices.

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Special Articles

A CHINESE MILITARY HOSPITAL

AS SEEN BY A FRIENDS AMBULANCE UNIT TEAM

IN 1937 China was faced with a choice of evils—either to submit to Japanese aggression or to take up arms in her own defence. Enough has been written to indicate that a policy of submission to the aggressors would have been a very considerable evil; possibly less is known about the evils which were inevitably attendant on the other policy. The notes which follow describe some of the conditions which the Chinese had to face in their long war against the Japanese. It would probably be fair to say that the Chinese realised that they would have to face these conditions and chose their course in spite of this knowledge. It may be doubted whether any Western government would have had the courage to make such a decision.

It is commonly regarded as essential to the prosecution of a modern war to have adequate sources of supply to feed the armies in the field and a medical service capable of dealing with the casualties which occur. China could not rely on having either of these two important services at her command. The difficulty of feeding the enormous armies kept in the field accentuated the medical problem. Inadequate feeding might have been less serious if the Chinese army medical services had been able to rely on ample supplies of drugs and of trained personnel. In fact they had neither. The number of doctors serving with the Chinese army who had received a good training by Western standards was very small indeed—possibly not more than 2000. This number was augmented by officers known as "I Guans." The training and experience of these men varies considerably, but scarcely any of them could fairly be described as medical practitioners or surgeons. Below this grade the quality of personnel tailed off rapidly. Nurses were almost non-existent, and the orderlies were nearly all without any training whatsoever and often illiterate men taken from the ranks. The shortage of all kinds of medical supplies made it almost impossible even for the trained medical men to carry out effective treatment on the scale demanded by an army of up to ten million men. This shortage was enormously increased as a result of the national blockade, which culminated with the Japanese occupation of Burma early in 1942. As in all countries, commodities which were scarce acquired a tremendous black-market value. Drugs in China are rated high on the black market, and have occasionally been used as a form of currency. Living as they do at a bare subsistence level, and probably having families to support, it is understandable that many of the men in charge of military hospitals succumbed to the temptation to sell some of the drugs entrusted to their care, thus reducing supplies still further.

The hospital described here was an intermediate hospital under the direction of the Chinese Army Medical Administration. This organisation was not in charge of all military medical work in China, but took over in the rear and supervised intermediate and base hospitals. Medical work nearer the front line was undertaken by the divisions themselves. Pay in the Army Medical Administration was lower than in the regular army. Inevitably it failed to attract the best men, who worked in the divisional medical services. This does not mean that the Army Medical Administration passively accepted the conditions in the hospitals under its control. The heads of the administration worked heroically to bring about improvements, but they had an uphill task. Shortly after this account was written, the men responsible for it were moved to a field hospital under divisional direction. The contrast was striking. Though the field hospital was not a luxurious place, it did provide some of the amenities which the word "hospital" denotes, in spite of the fact that there was little to build it with but bamboo, mud, and straw. It should also be added that a few months after this report was written a great improvement took place even in the hospital described.

The conditions existing in this intermediate hospital were not accepted by the Chinese themselves as inevitable. It was not uncommon to meet members of the Army Medical Administration, Chinese Red Cross, or other organisations in China who denounced certain hospitals in terms far more decisive than any Westerner would dare to use. It is clear that the end of the war, bringing we hope a flood of medical supplies to China, will do much to remedy the state of affairs. There is little doubt that the Chinese will improve and extend their medical services at an unprecedented rate as soon as conditions permit. There is also little doubt that there are medical men in China capable of providing the drive necessary for this expansion.

In any case, it must not be supposed that all Chinese soldiers had to put up with the conditions discovered by a Friends Ambulance Unit team in the latter half of 1943 at a hospital in Yunnan.

CONDITIONS IN THE HOSPITAL

At that time patients lay on the floor in pairs in a space six feet by four, marked out by wooden laths. Sometimes four patients had to share one square, and two patients one "pukai" (quilt). Pukais were made of untreated cotton and the packing bunched until the quilt became nothing more than a double sheet with lumps of rough cotton inside, which was useless as a covering to retain the warmth. Overcrowding, malnourishment, and the intermingling of patients with transmissible and other diseases favoured cross-infection. In a ward of 50 patients there were only two wash-basins, one of which was kept for the orderlies and the other for patients to wash their hands and clean their bowls. No soap or towels were provided; but a weekly scabies bath was introduced, after which the patients got back, wet and shivering, into their verminous clothes. There were no bed-pans, so that patients had the choice of climbing up and down stairs and running 100 yards to an outside lavatory or of excreting in the bedding, when they were liable to be beaten by the orderlies. Dysentery cases, being unable to contain themselves, had no choice in the matter. The floors were old, with large spaces between the boards, so that excreta fell from the upper ward on to the patients in the ward below.

There was a gross shortage of nursing orderlies, and those there were showed little interest in the patients' needs. Patients were driven by threats to the latrines, to which they could be seen crawling on hands and knees. If a man did not drag himself to the container outside the ward at meal-time, he often had to go without food; despite repeated remonstrances, orderlies failed to feed those too weak to fend for themselves; feverish and dehydrated patients could not get water, and anyone entering a ward at night was greeted by pathetic cries for water. The orderlies, despite repeated representations to the authorities, shifted patients at will, thus frustrating attempts to group cases and prevent cross-infection. They were instructed in some routine treatments, such as that for scabies, but carried them out effectively only when supervised. Some improvement in nursing followed the placing of tags at the heads of beds—*T* for temperature, *E* for eye treatment, and so on. The management of the hospital was dilatory, and, though the chiefs were pleasant and attentive to complaints, no effective reforms were carried through.

Most patients suffered on admission from malnutrition, beriberi, scabies, œdema, or worms, besides other more serious disorders such as malaria, typhoid, dysentery, relapsing fever, or pneumonia. Malaria, which spread alarmingly among the patients, was treated with quinine sulphate except where the patient had dysentery or acute œdema or could not take it, when quinine bisulphate was given intramuscularly. Typhus was difficult to diagnose because the local type simulated malaria; most patients had coarse flea-bitten skins and often secondary infected scabies, so that it was impossible to identify a rash. Dysentery cases were isolated wherever possible; and most of them responded to emetine hydrochloride or emetine, as the case might be, provided they were not too weak to stand the treatment. Relapsing fever was very common, being passed round the ward by lice and fleas, which abounded in the bedding. Most patients became infected with worms during their stay in hospital. Eye infections were frequent, and were hard to treat owing to lack of facilities. Scabies was almost universal; secondary infection was treated with gentian

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violet, but nearly all the patients continued to scratch and reinfect themselves, so it was essential to cut their finger-nails.

STATUS OF THE I GUAN

The I Guans were, in the main, very inefficient. As the Chinese doctor working with the unit pointed out, the poor salaries necessitated by national poverty did not attract those with interest or energy; and enthusiasm could not be expected from conscripts. The unit at first did most of the medical work themselves, with the idea of inspiring the I Guans; but these seemed to feel that the foreigner, by taking everything into his own hands, was disregarding and humbling them before the patients. They were therefore made fully responsible for their patients, with doctors of the unit ready to advise where necessary, and their work improved perceptibly. The I Guans had been accused of shirking responsibility; but this may well have been a sign of passive resistance to what they regarded as an infringement of their rights. This raises the wider issue of the relationship of Chinese and foreigners in general, which has not always been of the happiest. It is as difficult for the foreigner newly arrived in the country to understand the Chinese way of thinking as it is for the Chinese who has never set foot outside his native village to understand the foreign mentality. It is therefore well to pause and try to understand motives before rushing into condemnation: for the foreigner an adaptation to the immediate environment is more important than considerations of universal convention.

PHYSICAL EDUCATION IN INDUSTRY

METHODS of job-analysis and vocational selection (or putting the right man in the right job) have been developed by industrial psychologists both abroad and in this country, where the Industrial Health Research Board and the National Institute of Industrial Psychology have done pioneer work. Of the fighting Services, the Royal Air Force was the first to adopt and develop these methods, which have been used with great success during the war by all the Services. The Research Board for the Correlation of Medical Science and Physical Education in its fourth interim report [1] recommends that experience gained during the war should be applied to industry. There should be more coördination, the report says, among organisations which study the subject, and the advice of such bodies should be more readily available to all firms. For this purpose, the board thinks that the numbers of works medical officers and welfare-workers should be increased; that the coöperation of specialists in physical medicine should be sought; and that firms should employ experts in physical education. It is expected that in the immediate post-war years the methods of vocational selection will in fact be more extensively used in industry.

The report covers a wide field—perhaps a little too wide—though Dr. Frank Howitt in a foreword stresses the wide implications of the term physical education. "A full scheme of physical education," he says, "cannot be divorced from its background of nutrition, housing, environment, rehabilitation, and research." Surely a better description than physical education could be found to cover all these subjects? And why only physical, when the mental education of industrial workers is also discussed? These, however, are minor criticisms. None will disagree with the statement that harmony between the individual worker and his job is essential to his health, well-being, and efficiency. Much of the report is devoted to a discussion of measures to promote this harmony; an excellent chapter emphasises the importance of recreation, and surveys the schemes for education and recreation in various firms such as Cadbury's and Sigmund Pumps. The facilities for recreation at High Wycombe and Slough are described, and also the community centre at Impington. No attempt is made to give a complete account of all existing facilities in the country; but the well-established educational systems at Clark's factory at Street, Rowntrees at York, Boots at Nottingham, and Newton Chambers at Thorncliffe, and the unique continuation school for young factory workers at Rugby might have received honourable mention.

THE NEED FOR TEAM-WORK

Another recommendation is that suitable leaders of physical recreation should be trained, and that ex-Service instructors should be used for this purpose. As for reablement, it is emphasised that, to secure the best results, surgeons, physicians, psychiatrists, nurses, physiotherapists, physical educationists, education officers, almoners, welfare supervisors, ministry officials, training-centre authorities and instructors, trades-union officials, the employers, and the patients themselves should work together as a team. Closer liaison should be established between authorities responsible for reablement and resettlement of workers in industry. The board also hopes that the introduction of county colleges for young people, which has been made compulsory by the Education Act, will not be unduly delayed, and that these colleges may form centres for recreational and other activities. It is added that for the health of young workers the factory law on the hours of employment should be strictly enforced; but no evidence is given to show that this law is not being enforced. A plea is made for closer coördination between industry, youth, and voluntary organisations. The report indicates the need for medical supervision of youths in industry, and for research into the effect of various jobs on physical development. Medical officers often see examples of the bad effects of certain types of employment on posture, on the feet, on the internal organs, and on the general health. Many of these effects are preventable by attention to the lighting and seating arrangements and to the position of machinery; remedial exercises under proper supervision would benefit minor defects. It is thought that the adaptation of the present Service physical development centres to civilian use should be seriously considered, and that "conditions of entry to physical development centres should be such as to encourage young employees either to apply for entry to the centres or to feel reconciled to direction to them by industrial medical officers." Further investigation should be undertaken into women's work in industry and its effects on their health. Better facilities for rest, relaxation, and physical recreation for women and girls should be introduced into factories; special training in corrective and compensatory exercises on the lines suggested by the Central Council of Physical Recreation should be more widely introduced.

INDUSTRIAL HEALTH SERVICE

A long chapter is devoted to the occupational health services—a subject which does not appear to be quite within the board's terms of reference or within the scope of "physical education." Its remarks and recommendations appear to be based on the report of the Royal College of Physicians, already reviewed in these columns.[2] The first recommendation on this subject is that the industrial health service should be planned as an integral part of the National Health Service; another is that the industrial service should be a coöperative undertaking with full support from both management and workers. It is suggested that pre-employment medical examination should be undertaken where possible (a controversial point) but that this examination should be used for placing a worker in the job most suited to him, and not for rejecting him as unfit. The practice of providing reablement shops in factories should be extended, and experiments should be made in establishing polyclinics in industry. It is added that employers should not be expected to subsidise these clinics otherwise than by allowing the employees to attend during working hours. Medical and personnel officers in factories should have facilities for research, in which they should be assisted by universities and other bodies. As regards education in occupational medicine, the board contents itself with a recommendation that the conclusions reached in the report [3] of the Association of Industrial Medical Officers should be studied and put into effect.

The board is a little too optimistic in its expectation that the lessons of war will be actively applied in the

1. Medical Science and Physical Education in Industry. 4th part of the interim report by the Research Board for the Correlation of Medical Science and Physical Education. London. 1946. 2s.

2. *Lancet*, 1945, i, 150.
3. *Ibid*, 1945, ii, 499.

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immediate post-war years to the problems of peace. Experience does not suggest that this will be so; it is said that lessons gained in war are soon forgotten in peace. The intensity of war makes for speed in movements and ideas, and when peace comes the pace slackens. After all, the word "peace" does connote a state of placidity and slow metabolism. But this is no excuse for neglect to apply the experience gained in war. What is fairly certain is that the rate of progress will be slowed. It is hoped that the board's enthusiasm will not be damped by the placidity of peace, and that its good work will continue.

NATIONAL HOSPITAL SERVICE

ALTERNATIVE PROPOSALS

THE British Hospitals Association this week issues a plan for a National Hospital Service, within a National Health Service. It is intended to provide on a secure financial basis "a comprehensive service free to the citizen, combining the resources of the State with all that is best in the existing services, including the voluntary hospitals with their pioneering spirit, tradition, and experience." The proposals are as follows:

1. The *Minister of Health* would assume general responsibility for the direction and financing of the hospital service required within the National Health Service.
2. A *Central Hospitals Board* would be appointed by the Minister to which, subject to his veto, he would delegate the major duties and responsibilities, including the framing of national policy. This board would be wholly or largely representative in its composition of the major agencies through which alone the Minister can design and operate the service—i.e., the medical profession, voluntary hospitals, the local authorities, the dentists, nurses, and pharmacists. The Minister would therefore appoint the board after consultation with the appropriate bodies.
3. *Regional hospital boards* would be appointed by the Minister and charged with the duty of planning and extending the hospital services so that the whole field of hospital treatment would be covered in each region, while leaving the patient freedom of choice of hospital. One of the great medical teaching centres would be associated with each of these regions. The board would decide the nature of the services required from each hospital in its region and be vested with such executive powers as may be necessary to ensure that its plan would be put into operation. These boards would be appointed after consultation with the appropriate bodies, including the universities, and would (as in the case of the Central Hospitals Board) be wholly or mainly representative in composition.
4. The *individual hospital* therefore, through its committee of management, would remain entirely responsible for the internal management and general conduct of its affairs; but its first duty would be to provide the service required of it under the regional plan.
5. The *voluntary hospital* would retain in trust its buildings and assets, thus preserving its entity and ensuring a reasonable degree of freedom in the interests of medical research and progress, of the service, of the patient, and of the community.
6. *Finance.*—So far as the voluntary hospital is concerned it would receive payment from the State for services required and rendered but would still be free to attract personal interest in its work and support for special purposes, for any activities outside the scope of the national service, and for the general improvement of its services, including the comfort of both patients and staff.

This plan, in the association's view, "maintains a balance between the organisation required for a national service on the one hand and the obvious dangers in *any* national plan on the other hand—loss of the personal and human touch, loss of local interest and the danger of making the patient fit the scheme instead of the scheme being made to fit the patient. It provides for the voluntary hospitals to be retained alongside local-authority (or State) hospitals, but working together, as has already been done in some parts of the country, in a service properly planned and organised over regions and centrally directed on a national basis.

"It acknowledges that the success of the voluntary hospitals has been chiefly due to their methods of direct management and to the widespread personal interest which they have attracted to their work. It leaves the individual hospital the necessary freedom to endeavour to improve its own service and retains local interest."

WAGES OF HOSPITAL EMPLOYEES

AT the end of last year [1] a national joint council, representing employers and employees, was set up to formulate terms of service for domestic and non-nursing staff in hospitals, and on March 5 they adopted a national minimum wage scale which will come into force in England and Wales on April 1. A separate council is negotiating rates for the Scottish hospitals. The new scale is minimal, and eleven provincial joint councils are being established with powers to recommend higher rates in their own areas. A special committee of the council is considering whether higher rates should be prescribed for workers in mental hospitals for general application without regional variations. Where current rates are low the new scale will mean an immediate increase, but workers who are already receiving higher wages will suffer no reduction.

The minimum wage now laid down for adults is 86*s.* a week for men and 64*s.* for women. Youths will receive the adult rate at 21 and girls at 19, and there is a sliding scale for juveniles beginning at 40% of the adult wage for both boys and girls of 16. The full adult rate will be paid where a juvenile is doing a full adult job. For resident staff 23*s.* a week may be deducted for board, lodging, and laundry. Appropriate deductions are laid down for juveniles who are living in and a tariff of charges for meals served to non-resident staff.

The following are some examples of the weekly wages which will be paid on the new scale:

WOMEN			MEN		
—	Resident	Non-resident	—	Resident	Non-resident
Cooks	53*s.* or 59*s.**	76*s.* or 82*s.**	Ambulance driver ..	73*s.*	96*s.*
Assistant cooks..	47*s.* or 53*s.**	70*s.* or 76*s.**	Steam stoker; gate porter ..	71*s.*	94*s.*
Ward orderlies, needlewomen	47*s.*	70*s.*	Ward orderly ..	69*s.*	92*s.*
Certain special maids	45*s.*	68*s.*			
General maids ..	41*s.*	64*s.*	General porter	63*s.*	86*s.*

* Holding a recognised diploma in cookery.

The new rates are to be paid for a 48-hour week, and workers will be entitled to 12 days' annual leave, besides public holidays, after one year's service. Overtime will be assessed weekly at the rate of time and a quarter for the first three hours and time and a half thereafter. Sunday work will be paid at the rate of time and a half and overtime at double rate.

1. See *Lancet*, 1945, ii, 638.

PULMONARY CARCINOMA IN TURKEY.—During the last 30 years there has been a striking increase in cases of lung cancer diagnosed in Turkey. Within 23 months Prof. T. Saglam, the rector of Istanbul University, saw 11 examples among some 2000 patients (*Bull. Fac. Méd. Istanbul*, 1944, p. 3793). From 1935 to 1943 there were 5126 autopsies performed in the Anatomo-Pathological Institute of the university, and pulmonary carcinoma was found in 79. Men were affected much more commonly (92·4%) than women, and the right lung was involved slightly more often than the left. In other European countries, and in America, Australia, India, and Japan, a similar increase in incidence has been observed. It has been suggested that cigarette-smokers are particularly prone to the disease. In Turkey most smokers smoke cigarettes and the consumption of tobacco has doubled itself in 16 years. Yet the relative increase of the disease in Turkey is no greater than in countries where pipes and cigars are more popular.

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In England Now

A Running Commentary by Peripatetic Correspondents

TILL last week (Sir Hugh Lett told us) no president of the Royal College of Physicians of London had ever formally visited the Society of Apothecaries to deliver an address. Arriving just in time to secure the last seat in the crowded hall, I found Lord Moran describing the difficulties of training a democratic army.

Our citizen soldiers, he pointed out, had been brought up to believe that war settles nothing, and it says much for our race that with such a preparation they did what they did. At the beginning of the war we had no time to produce the kind of Regular Army discipline attained by repeating actions till they become automatic. (Incidentally, he asked, why do the Guards attach so much attention to precision of movement but so little to precision of thought?) Nor had our troops much of the pride of arms: we had got into the habit of making fun of them; and, as an eminent general had remarked, if you make an aunt sally of an army you *get* an aunt sally of an army. The cement that held them together was the young officer, playing the trump card of example, and showing the imperturbability in face of danger which is admired by soldiers more than any other quality. A similar grip over the people under them is occasionally achieved by the higher command, but many of the effects ascribed to the personal magnetism of leaders have a more prosaic explanation. With few exceptions the great leaders of the past have had no sense of humour and have lacked all the graces—but they have won battles. The secret of success in war is success.

Troops want their leaders to have enough brains to win battles, and Lord Moran has found the scientific mind as common (or uncommon) among soldiers as among practising doctors. He felt, however, that mess life and the fetish of exercise do not give full scope to brains. Nor does the soldier in peace-time practise the vital art of selection, which for most of us needs cultivation and begins with an interest in people. The consulting doctor may see a different stranger every three-quarters of an hour, and must find out all about him; but personalities are taboo in the mess, and among men of the larger world the soldier sometimes appears a little naïve. The art of leading, like the art of healing, is the art of making plans and persuading someone to carry them out; so the right selection of men is vital. The man of character in peace is a man of courage in war; and, as Aristotle said, character is a habit—a daily choice between good and evil. But no scientific tests have yet been devised, and in the search for courage we still depend on our appraisal of its ingredients.

Lord Moran illustrated his remarks on toughness and on wisdom—"the rarest of all qualities in war"—by observations on Mr. Churchill and Mr. Roosevelt. Those of his hearers who have obsessional patients to persuade made a note of his statement that there is hardly a man of consequence in the world who does not find some part of the day when he lets his engine run down. Thus reassured we passed on to enjoy the soirée so pleasantly provided by the Society's master and wardens.

* * *

The native tribes inhabiting my section of the Canadian Arctic are mongoloid in type; not at all like the big, raw-boned Redskins typical of the Canadian prairies. I contend that they originally migrated from Asia to North America via the Behring Straits. At all events, these natives have flat faces and slanting eyes, and many have folds of skin, an epicanthus, at the medial angle of their eyelids. Having thus obtained natives of Asia as patients, naturally these natives have babies, and just as naturally, it seems, I have to get up at night to attend them. You doctors who complain about simply having to get out of bed for maternity cases should read on, and see how lucky you really are.

One day in late fall (winter comes in October here with 60°–70° below zero at times) I was called to see an Indian woman in labour at the village some four miles from my cabin. The only way to get there was by canoe and outboard motor on the river. The main rivers in the Yukon are great big streams that accommodate steamboats. My particular river at the time was running ice just before freeze-up; big cakes of slushy stuff that bang against the boat. My particular Indian guide had just started to take me up the river, when, as usual with Indians, the gas ran out. So, at night and in the icy river, we (mostly I) rowed and poled the boat four miles upstream.

Arriving at the village, I entered the single-roomed log cabin, lit only by flickering candles. The opened door let out a cloud of moist sweaty air that smoked gently on contacting the frosty atmosphere outside. As is the custom at Indian births, all the old women had collected at the patient's cabin. Dimly, I could discern a circle of squatting squaws around the room's periphery, for all the world like a set of pensive Buddhas. In the centre of the circle a horizontal pole had been placed, supported by crude tables. To my amazement, the patient was bent across this pole with a pair of willing squaws pulling on her arms and legs. This, I learned, was to increase the pressure on the labouring woman's abdomen and hence aid in the expulsion of the fœtus. Nobody in the room could speak English, so a history was impossible. One devilish thought, compensating for all this trouble, ran persistently through my mind—here was one woman, draped as she was over the pole, that could be examined rectally with precision and directness, in contrast to the usual troubles in a feather bed!

My difficulties had really only started. The examination was just under way when my patient let voice to a volume of Indian that was profane in any country. One by one the squaws in my clinic rose, spat majestically on the frozen mud floor, and left with ill-concealed disgust. I eventually got the woman off the pole and with some luck (mostly in the dark, obstetrically and physically) delivered an occiput-posterior.

The Indian guide and I started back home in his boat. It was a beautiful, brisk, cold night. Everything was illuminated by that silvery blue light characteristic of Arctic moonlight, which flashed back in myriad twinkles from the icy facets of the floating pack. On the shore it scarcely penetrated the solid bank of gnarled spruce—silent sentries flanking the river. As the boat elbowed into the ice, I wondered what other doctors the world over were doing. Some would be working in big bright hospitals, surrounded by nurses and assistants. Others probably would be employed in sweating tropical countries or dry deserts. At all events, if they had the same sense of useful work accomplished, time and place mattered but little. How insignificant we are! Just a few years here and then a high dive into an oblivion as inscrutable as this forbidding land.

Then, as suddenly, it occurred to me to ask my guide why all the squaws had deserted me during the delivery. The Indian himself spat and in broken English told me. It appeared that no native woman, obstetrically or otherwise, regarded the proctological approach as anything but disorientation.

* * *

My fellow correspondent of March 2 revealed a fine sensibility in his remarks on lying in bed; but his observations are surely incomplete without reference to the twilight state. For the benefit of those insensible boors who rush from their beds of a morning to dig the garden, run round the block, or otherwise pursue some phantom worldly gain, it should be explained that the twilight state is one of ecstasy, midway between waking and sleeping, which is attainable only in the morning when, with the blankets warmed by the night's recumbency, the bed, like a snug nest, offers no distracting chills; in this happy state fancy is free to wander as it will, and, when whimsy has had its play, to topple gently back into the cool pool of sleep, there to pursue the delights of gay unreality.

The pastime is savoured to the full only in stolen moments; in our house, 8.45 is the most propitious time for its appreciation, for breakfast is at 8.15. Sounds audible but never obtrusive, may, by recalling the industry of others, aid one's relaxation. The subdued cacophony of pots and pans, the muttered grumble of the boiler as it is debunked (theoretically my task), and the high staccato notes of a wife's cajolery, serve the purpose admirably. As a novice, I thought that the gentle olfactory titillation of bacon in the pan was a delectable adjuvant; but experience has taught me that what at 8.10 manifests itself as a seductive odour will have become a bare hour later an unlovely slab of congealed fat, thwarting the hardiest appetite. So bacon is now barred.

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Parliament

ON THE FLOOR OF THE HOUSE

THE second-reading debate on the National Health Service Bill will be held before Easter, and before then the Medical Parliamentary Group, which is all-party, will meet for discussion to see how far general agreement can be obtained and how far members diverge on special questions. The proposals are regarded as one of the main Bills of the Government and in scope and significance it is probably one of the most important.

The Minister of Agriculture announced on March 11 a new plan for production of food which will increase by 2½ million acres the 1947 wheat harvest as well as the maximum practicable acreage of potatoes and sugar-beet. Prices are guaranteed to farmers by a four-year plan up to 1950. We must do this although we belong, with Denmark, Sweden, and Switzerland, to the fortunate part of Europe where the average daily diet is still over 2500 calories even among the non-farming population. France will be receiving, in the cities, 1500–2000 calories. Over the rest of Europe there is greater or less deprivation everywhere. It is significant that figures of diets are now given for farm populations and non-farm populations, and it seems clear that a large proportion of those living on the land will live and a large proportion of those living in the towns will die. In the East famine is certain over large areas, and also in Africa where harvests have failed. That the World Food and Agriculture Organisation, with Sir John Orr as its director-general, is already in being and pledged to bring nutrition in all countries to a good standard is a reassuring fact in a grim world.

The need to consider in detail the future strength of our armed Services is urgent, for the medical profession as for every other section of the population. How conscription can be fitted in with the training of the medical student is receiving close attention. The shape of things to come in the Services is still unknown because it depends on UNO decisions. This week the House considered the function of the military staff committee of the Security Council and a plea was put forward for an international general staff. A permanent military general staff under the control of the Security Council will be necessary if the Secretary-General is to discharge his duty of determining whether a breach of the peace has been committed. Thus advances are being made along the line of international development as quickly as can be reasonably expected, if not as quickly as may have been hoped. Every advance gives the scientist and the scientific mind a greater degree of significance and world importance. MEDICUS, M.P.

FROM THE PRESS GALLERY

Three in One?

In the course of the debate in the House of Commons on March 12 on the Air Estimates for 1946, Squadron-Leader S. SEGAL stressed the essential contribution which medical research had made to bomber and fighter efficiency in the war, but deplored the appalling wastage of medical material which existed in the R.A.F. He knew of a R.A.F. station, for instance, with only 80 men, under the charge of a medical officer, though a large Army general hospital only 2½ miles away was fully able to cope with any medical emergency. Doctors in the R.A.F. were concerned largely with the care of young men in the healthiest age-groups and were almost debarred from the treatment of children. During the war the medical officer was not fully occupied and was unable to avail himself of the fullest degree of medical practice. On the other hand, he had enjoyed the closest coöperation with his colleagues in the Army and Navy medical services, and this reciprocity, Dr. Segal suggested, ought to be extended in the future. No doctor should be forced to spend the whole of his active life working for one of the Services alone, and an interchange of personnel among the three Services would secure even closer coördination. A tremendous saving in medical personnel could be made by following the practice of our American allies and separating the administrative side of the Services from the medical side.

He looked forward to the part which this comprehensive medical service, unified to serve the three great defence branches, would play in the future structure of British medicine. Doctors had not only an essential service to render to the R.A.F., but the R.A.F. had an essential contribution to make to British medicine, and doctors in the R.A.F. should be given scope to practise their art in all branches of medicine. The present Air Estimates, he thought, might have made a more generous contribution to the medical service than the allocation of £410,000.

In winding up the debate, Mr. J. STRACHEY, Under-Secretary of State for Air, regretted that he had not time to reply to Dr. Segal's interesting speech, but reminded him that the medical service catered for a force of under a third of the strength during the war, and therefore the allocation was not so small after all.

Frozen Cooked Foods

On the motion for the adjournment in the House of Commons on March 4, Captain A. MARSDEN gave a tantalising description of an experimental meal he had eaten, consisting of soup, fish, roast chicken, bread sauce, gravy, vegetables, and apple pie. He found on the table what looked like blocks of granite wrapped up in 'Cellophane' paper. While the guests were waiting before lunch the food blocks were put into a hot electric oven, which was on the table, and each course was taken out in turn perfectly ready to be eaten. By this process, he said, supplies of food were taken to kitchens as close to the source of supply as possible and there cooked by chefs under hygienic conditions. After cooking the food was immediately frozen hard, then wrapped in paper and stored in refrigerators. It could be eaten at any time, up to years afterwards. The food need not be cooked again, but only had to be thawed and warmed up. Under this system food, he suggested, could be bought in bulk when it was plentiful, cooked and refrigerated, and then put on the market as required. At the lunch he had attended bread had been one of the most successful items, and it was possible that this process could render night baking unnecessary. He asked that the Ministry of Food should coöperate with private enterprise in encouraging further experiments in the importation, production, and distribution of frozen cooked foods in the United Kingdom.

Dr. EDITH SUMMERSKILL, parliamentary secretary to the Ministry of Food, admitted to having also eaten a meal of frozen cooked food—though of more democratic dimensions, she added. She agreed that frozen food could relieve the lot of the harassed housewife. The people the Ministry wanted to help today were the masses, who relied upon cheap food, and when this frozen food could be produced cheaply she was sure that there would be a great demand for it. The Ministry of Food always investigated new processes, but Captain Marsden was asking them to give this one their blessing at a difficult time. Owing to the stringency of the food situation, they could not allocate large amounts of food for experiment, but any existing catering firm was entitled to adopt this process if it used the supplies obtained under buying permits as licensed caterers.

QUESTION TIME

Service Intake of Doctors

Mr. G. ALLIGHAN asked the Minister of Health what were the quotas of new medical officers originally decided upon for each of the three Services for the first half of 1946; and what adjustment was to be made in view of the disparity in the release-rates of general-duty medical officers.—Mr. A. BEVAN replied: The provisional quotas for the first half-year, 1946, are: Navy 60, Army 280, R.A.F. 110. The question of adjusting the quotas is at present being considered by the Government. These quotas apply to young practitioners up to the age of 30. In addition the recruitment of specialists is continuing up to age 40 to provide substitutes for specialists who cannot be released without replacement.

"Consensus of Opinion" Cases

Mr. T. W. BURDEN asked the Minister of Pensions if he would enumerate the diseases included as consensus of opinion cases.—Mr. W. PALING replied: It is not possible to prepare a comprehensive list of diseases, the onset or development of which would either generally or in certain circumstances be unaffected by war service. Moreover, individual cases are considered on their merits in the light of all the facts and these may at times enable an award to be made in respect

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of a condition which in general would be unrelated to service. The following are examples of cases in which normally the disability would be regarded as unconnected with service :—

Malignant diseases, with certain well-recognised exceptions; certain diseases of the glands, such as lymphadenoma; certain diseases of the nervous system of developmental origin, such as syringomyelia; certain diseases of the blood and blood-forming organs, such as leukæmia; progressive visual changes due to errors of refraction; venereal diseases.

Mr. BURDEN: What instructions have been issued to the independent tribunals in connexion with these cases?—Mr. PALING: None. These independent tribunals are in no way under my control or direction.

Recruitment of Hospital Staff

Replying to a question, Mr. G. ISAACS, Minister of Labour, stated: During 1945 my department placed 2480 women and 381 men in mental nursing or mental-deficiency nursing. In addition employers engaged just over 1000 nurses by direct contact, making a total of practically 4000 persons engaged for mental nursing and mental-deficiency nursing during the year. In 1945 my local officers filled nearly 50,000 domestic vacancies in hospitals of all types.

Provisional Notifications

Dr. B. STROSS asked the Minister of Health whether he would cause the conditions of pleurisy, phlyctenular conjunctivitis, and erythema nodosum to be made subject to provisional notification, in order to assist in the prevention and treatment of tuberculosis.—Mr. BEVAN replied: The desirability of bringing the conditions mentioned to the attention of the tuberculosis service is recognised, but I am advised that this would not be achieved simply by instituting a procedure of notification. The important thing is that general practitioners should be fully aware of the significance of these conditions in relation to tuberculosis, and should encourage recourse to the specialist facilities of the tuberculosis service whenever they are met with. I am considering what I can do to help in this.

Silicosis in the Pottery Industry and in Tin-mining

Replying to Dr. STROSS, Mr. J. GRIFFITHS, Minister of National Insurance, stated that from 1933 to 1944 19% of the workers in the pottery industry who were certified by the Silicosis Medical Board were found to be suffering from silicosis accompanied by tuberculosis. In cases of silicosis, tuberculosis may become manifest after certification. The experience of the medical board in North Staffordshire is that the average period between certification and death, in cases where the death is found to have been caused by silicosis accompanied by tuberculosis, is just over 2 years; in cases of silicosis alone it is 5–7 years. In the individual case the period depends, of course, very largely on the workman's age and the degree of his disablement at the time of certification.

Mr. N. A. BEECHMAN asked the Minister of Fuel and Power whether he was taking steps to assist research into protective measures against silicosis in tin-mining.—Mr. E. SHINWELL replied: I have arranged to coöperate in an investigation recently started in Cornwall by the Medical Research Council. This investigation will include X-ray examinations of men employed in tin-mining and tests to determine the preventive and curative effects of inhaling aluminium powder.

Calorie Value of Rations

In answer to a question, Dr. E. SUMMERSKILL stated that the present average daily intake of calories per head of the civilian population in the United Kingdom is approximately 2900. Of this, it is estimated that rationed foods provide 1200 calories and unrationed foods 1700 calories.

Rationing in the Indian States

Replying to a question, Mr. A. HENDERSON said that, in general, large cities in the Indian States are rationed, but rationing does not extend to the bulk of the population in the villages except in Travancore, Cochin, and possibly Mysore. The scale of the cereal ration in all important Indian States has been or is now being reduced to 12 oz. per adult per day, or 5¼ lb. per week, with a supplement of 4 oz. a day for heavy manual workers. The calorific value of 12 oz. of cereals is about 1200 calories and cereals generally form roughly 80% of the diet in India.

Austrian Doctors

Replying to a question, Mr. HYND said that in 1946 in the British zone in Austria the number of doctors was 0·9 per 1000, while in pre-war years it was 0·8. In Vienna the figure was 1·9 per 1000 today, against 2·1 per 1000 pre-war. In Vienna today the doctors represented 1 per 521 of the population and in this country 1 per 1234.

Letters to the Editor

AUTOPSIES FOR THE CORONER

SIR,—There are two aspects of your leading article of March 16 which cannot be emphasised too strongly. The first is that the time is long since past when any registered practitioner per se is to be regarded as competent to carry out the plainly skilled and responsible task of performing an autopsy for the coroner; when he relegates the procedure to the mortuary attendant—an indefensible scandal still to be observed even in the "larger centres"—he is discharging this onerous duty with an abandon that approaches culpable negligence. The second aspect concerns the coroners themselves. Their important duty to the public can be served with greater justice by insisting on the provision of proper mortuary accommodation. The cost of removal to centralised mortuaries is a small expense for such dividends as accuracy of observation and a consistently sound medical service such as cannot obtain in "sheds adjoining pig-swill plants or knacker's shops, in frigid barns, or in blacked-out outhouses of corporation yards." No council could defend the refusal to sanction disbursements by the coroner for removals from such "mortuaries." The coroners themselves hold the golden key: they can be assured of the strongest support of all pathologists.

I am not, of course, referring to cases of a criminal character where the gravity of an impending charge emphasises the importance of the two facets of your article to which I draw attention. This country has in the statutory provisions of the Coroners Act of 1887 and the Coroners (Amendment) Act of 1926 the vehicle for a model service. It has been deplorably slow to realise the fact.

Guy's Hospital. KEITH SIMPSON.

EFFECT OF LARGE DOSES OF ALKALI ON KIDNEY FUNCTION

SIR,—Dr. Locket, in her letter of Feb. 2, has made some criticisms on the paper by the Army Malaria Research Unit (Dec. 1) which we should like to answer on behalf of the unit. We admit there is substance in some of her criticisms of detail, but we hope to show that her more general criticisms are either without foundation or are beside the point of the main conclusions of the paper—that "the amount of alkali given in these experiments had measurable physiological effects, including disturbances of renal function," and that "in blackwater fever and other conditions often accompanied by renal failure, alkalis, if given at all, should not be pushed to extremes." We consider that this last statement is not quite so far-reaching a conclusion as Dr. Locket suggests.

We do not suppose that results obtained from four experimental subjects can be offered as much more than illustrative support for our contentions. The Malaria Research Unit was broken up soon after the experiments were completed. Because of this and also because the dangers of the Sippy alkaline treatment were already well known, as Dr. Locket observes, it was felt that publication of these experimental results need not be delayed, perhaps for years, until an opportunity arose for extending them sufficiently for statistical treatment.

With regard to the detailed criticisms, it must be admitted that the tables in the paper showing the urinary excretion of sodium are incorrect. In all the tables "Urine (mille equivalents per litre)" should have read "Urine (mille equivalents per 24 hours)." The correction of this regrettable error substantiates the claim that there was considerable sodium retention.

With regard to the changes of weight observed, the phrase "The degree of water retention calculated by this rough measure is of the same order," objected to by Dr. Locket, is possibly too strong, even when considered in conjunction with the extremely rough and imperfect methods of calculation available. The changes in weight were nevertheless in the same direction as would be expected if there had been water retention during the administration of the alkali. There is no need to stress the value of this in view of the indubitable nature of the evidence of water retention given elsewhere in the paper.

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No suggestion is made in the paper that there was any significant fall in the urea-clearance in subject 1: Dr. Locket is here in complete agreement with the authors. It may be observed that except for subject 1, who was 45, all the subjects were well under 30; the maximum renal changes occurred in a healthy young soldier aged 24.

In experiments of this nature a certain degree of water diuresis is a necessary part of the clearance tests. This, of course, accounts for the fluid intake recorded in the tables. The normal kidney can easily clear five litres a day or more with no signs of water retention. In our experiments evidence of water retention appeared only on the administration of alkali.

It is to be hoped that Dr. Locket or some other observers may be in a position to repeat these experiments with the controls Dr. Locket recommends. We await the results of such experiments with confidence. Even if all Dr. Locket's criticisms of detail were valid, which we think we have shown is not the case, this would not affect the conclusions reached by the Malaria Research Unit, and quoted above. These conclusions are in the main drawn from experimental results on which Dr. Locket makes no comment (blood dilution, alkalosis, clinical observations, &c.).

We are sorry Dr. Locket disapproves of the title of the paper. Alkalis today are nearly always given in the form of sodium salts, especially when, as here, large doses are employed. (See, for instance, the regimes referred to in the opening paragraphs of our paper.) For this reason, and because we assumed that our readers would be aware of the dangers of high potassium dosage, we felt justified in entitling our paper "Effect of large doses of alkali, . . . &c." We still hold this view.

Any differences there may be between Dr. Osman and the Research Unit are obviously only questions of emphasis, on which your readers will be able to judge. Dr. Osman's remarks about our paper do not, in our view, disclose real grounds for dispute. We agree with him that large doses of alkali should in any case not be employed under conditions where careful control is not readily available.

R. E. HAVARD.
B. G. MAEGRAITH.

Oxford.

WHITHER MEDICINE?

SIR,—In your issue of Dec. 22, which has just reached me, Squadron-leader John Grieve raises a matter of more than temporary interest. On first reading his letter I thought he was appealing for a broader basis for teaching and practice. Further study, however, suggests that it is a plea for broadening our conception only in one particular direction—a direction, moreover, which I believe to be harmful to medicine at its present stage of development.

At the outset he notes (quite correctly) that "we are witnessing the birth-pangs of medicine as a science"; but his letter then appears to become a lamentation of this fact! I am in doubt whether he fully realises the implications of his arguments. This confusion arises from some misconceptions as well as the inability to resolve certain apparently contradictory postulates. Throughout he uses the words "science" and "technology" as interchangeable terms, thereby confusing the part with the whole; then he proceeds to oppose this vulgarised "science" to "philosophy," again confusing the part with the whole. First, technology is not science but the foundation on which science is built; second, philosophy is itself the science of thought, and the more that scientific methods are used in the elucidation of some philosophical problem the closer do we come to achieving a scientific, verifiable answer.

Philosophy is not some ideal absolute, any more than Truth, Justice, and Beauty. There is good philosophy and bad philosophy. There are the dreamy Joadish arguments concerning the wisdom of ancient institutions, and there is clear reasoning based on historical experience (Sherrington, Sigerist, Joseph Needham, J. B. S. Haldane). Squadron-leader Grieve himself illustrates this fact by his appeal for a "philosophy" which is no more than an appeal for a *particular type* of philosophy—the vaguely liberal humanistic tradition which he seems to see threatened by the inexorable march of scientific thought.

Does he really yearn for the sort of learning to which we are occasionally treated by some of our pundits in their periodical orations? Often these consist of no more than a rehash of all the known facts about some subject, liberally interspersed with obscure quotations from the writings of some ancient oracle; anything previous to the 16th century is usually considered appropriate! This is sleight-of-hand philosophy.

He says: "Medicine must have its philosophers if the patients are to be treated as human beings, not as a series of laboratory exercises." (Shades of the benign family doctor, and the wisdom of the great Individual threatened by the scientific organisation of modern medical practice!) Surely we must rather say: "Medicine must have its scientists, and its scientific philosophers arising therefrom, if the patients are to be treated as social human beings and not as some esoteric intellectual problem."

Indeed "we are witnessing the birth-pangs of medicine as a science." As good doctors, however, we should not obstruct the delivery with the cloudy clichés of ancient thought, but rather assist the birth by the scientific study of the development and organisation of society and social institutions, to discover how our "human being" patients live and work and think, and why!

Mombasa, Kenya. LIPMANN KESSEL.

NEW ACRIDINE DERIVATIVES

SIR,—In their letter of Dec. 15 (p. 797) Wien, Freeman, and Harrison suggest that the 1-methyl derivative of 5-aminoacridine possesses no advantages over the parent substance, 5-aminoacridine ('Monacrin,' Bayer; 'Acramine,' Glaxo) for the local treatment of infected wounds. This raises interesting questions as to the relative importance of favourable properties in a local antibacterial, and as we have been responsible for introducing both these drugs (Rubbo et al. *Brit. J. exp. Path.* 1942, **23**, 95; Albert et al. *Ibid*, 1945, **26**, 160) some comment from us may be expected.

The following facts are cited in favour of according 5-aminoacridine and its 1-methyl derivative a more thorough clinical comparison than Dr. Wien and his associates appear to recommend.

Antibacterial Activity.—Our published tests comparing 5-aminoacridine and its 1-methyl derivative involved the use of 11 gram-positive and 11 gram-negative bacterial species. The average inhibitory dilutions with 5-aminoacridine were 1:160,000 and 1:100,000 for gram-positive and gram-negative types respectively, whilst 1-methyl-5-aminoacridine scored 1:300,000 and 1:130,000 for gram-positive and gram-negative types respectively. Replicates demonstrated beyond doubt that a slight but definite increase in activity is shown by the 1-methyl derivative. Wien, on the other hand, examined only 3 species of bacteria and found no difference in activity between the two substances: a similar conclusion could have been drawn from our own figures had they been confined to this restricted range of organisms.

Systemic Activity.—Wien and his colleagues attach little importance to the decrease of 50% in systemic toxicity in the 1-methyl derivative, and place more emphasis on local necrotising and antiphagocytic properties. They found 5-aminoacridine and its 1-methyl derivative identical in the latter properties, and it is implied that no advantage has been gained with the latter from reduced systemic toxicity. With this proposition we cannot agree. The treatment of chronic sepsis, such as deep, ramifying sinuses infected with gram-negative types, frequently demands prolonged and continuous drip technique (Poate, H. R. G. *Med. J. Aust.* 1944, i, 242; *Lancet*, 1944, ii, 238; Turnbull, H. *Aust. N.Z. J. Surg.* 1944, **14**, 3), which over a period of time must result in absorption of large amounts of drug. Hence, any manœuvre which lowers systemic toxicity must be desirable in the management of chronic cases. Incidentally, clinical exploration of the usefulness of 1-methyl-5-aminoacridine in genito-urinary infections, when the drug is given orally, is now proceeding in Melbourne. This work was stimulated by the knowledge that 1-methyl-5-aminoacridine is a safer drug than 5-aminoacridine, although both have anticoliform activity of the same high order.

Blandness.—One of the greatest clinical limitations of 5-aminoacridine, of which we are acutely aware, is its insolubility in physiological (0·9%) saline. On the other hand, 1-methyl-5-aminoacridine is quite soluble in saline, so that

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a solution isotonic with blood and tissue-fluids may be kept always on hand (cf. Falk, J. E., Lederer, M. *Pharm. J.* 1945, ii, 208). This fact, together with those already mentioned, led us to recommend clinical trial of 1-methyl-5-aminoacridine in comparison with 5-aminoacridine which has been in regular use here since 1943. We know that it is idle to attempt prediction of the clinical value of two closely related drugs which have shown up well in laboratory trials. This is exemplified by the case of 1 : 9-dimethyl-proflavine which was perhaps the most promising in laboratory tests of our series of 107 acridines, but was found somewhat inferior to 5-aminoacridine by clinical standards.

In our opinion, once laboratory tests had narrowed down the choice and given clear indications of likely superiority in practice, an obvious mandate for the clinical trial of 1-methyl-5-aminoacridine was seen. Towards the end of the war, preliminary clinical trials were initiated in military hospitals in Australia. The results indicated that 1-methyl-5-aminoacridine, dissolved in physiological saline, had a superior action and was better tolerated by the patients than is 5-aminoacridine (private communications). It is hoped that other trials will be instituted until the relative value of the two drugs is well established.

Melbourne. SYDNEY D. RUBBO.
Sydney, Australia. ADRIEN ALBERT.

SPECIALISTS IN THE ROYAL AIR FORCE

SIR,—Having recently been a specialist in the R.A.F., I was interested to read in your issue of Feb. 3 the reply given by the Under-Secretary of State for Air to a question by Sir Ernest Graham-Little. Mr. Strachey said that "specialist's pay does not follow recognition as a specialist in the R.A.F., but specialists normally receive higher rank than non-specialist medical officers." Certainly this applies *on entry* to the Service, but he did not mention that there is a discrimination between specialists of different kinds. Medical, surgical, and orthopædic specialists can and do go on to receive higher rank and pay, but ear, nose, and throat specialists, for example, do not; and though they enter the R.A.F. at a higher rank than non-specialist medical officers, they get no further promotion, no matter how long they serve. After a year or so an E.N.T. specialist is in exactly the same position as a man—often recently qualified—who comes into the Service as a non-specialist and who receives promotion at the usual rate with length of service or with change of establishment.

London, W.1. W. A. HERVEY.

DEHYDRATION IN RHEUMATISM

SIR,—The article by Copeman and Pugh in your issue of Nov. 3 gives me courage to relate a personal experience that has aroused only mirth among my colleagues.

During the last five years in practice in a hot and humid East African station I developed a seasonal fibrositis with each onset of the hot and rainy months. It was manifest in two forms: (1) a generalised bilateral high lumbar ache without any demonstrable trigger-points; and (2) a few trigger-points over the attachments of the erector spini and gluteal muscles to the iliac crest and ischium, associated with unilateral pain and considerable disability. During a particularly severe attack early in 1943 the trigger-points were infiltrated with procaine with great success. The generalised ache, however, remained, and recurred with increasing disability and pain. In February, 1945, I went on leave down the Nile, a trip of some three weeks in a very high temperature. The lumbar pain at once increased and took on a spasmodic quality; fireman's cramps and salt-lack suddenly flashed into my mind, and I began to take common salt, about 20 g. a day in water with meals. A strength of about 2% was not unpalatable and was more thirst-quenching than plain water. The pain in the back was very much better in 12 hours, and in about 36 hours I was free from it, remaining so for the next two days after which I omitted the extra salt. Within 48 hours the pain was there again, to be removed in about 24 hours by the salt regime. A few days later I again omitted the salt, and again, though after a slightly longer interval, the symptoms came back, to be rapidly cured as before.

I continued to take salt during my leave in England, though I reduced the dose to about 5–7 g. per day. During the summer the condition returned, though in a milder form. I had a full examination, at which nodules were found in the lumbar muscles and the diagnosis of fibrositis was confirmed; I was recommended a course of deep massage, which benefited me considerably; and without increasing the salt I was soon again symptom-free. In September I flew back to East Africa. On the 10-day journey I omitted the salt, and on arrival in Dar-es-Salaam suffered a mild recurrence which quickly disappeared on restoring it. I continued with about 10 g. per day until a sharp attack of prickly heat made me wonder if the increased salt intake had any influence on this condition. Though the period during which I omitted salt coincided with a small drop in average temperature, the prickly heat did not improve; but in about ten days I experienced, for the first time since injection of procaine, a disabling attack in the old place in the buttock. To see what would happen, I waited a day or so until I was scarcely able to walk without a stick, and then went back to my salt. Four days later I played and enjoyed a strenuous game of squash. I feel I have proved the connexion in my own case beyond doubt; whether it is of general application, I cannot say; and I cannot test the connexion in others, since I am no longer engaged in clinical work.

A. A. Battson (*E. Afr. med. J.* 1944, 21, 383) describes an "outbreak" of fibrositis in a hot part of Uganda during which four patients were much relieved by the ingestion of large quantities of salt, administered as in my case.

Dar-es-Salaam, Tanganyika. ALAN MCKENZIE.

REST AND PROGRESSIVE RELAXATION

SIR,—The recuperative effects of rest and neuromuscular relaxation, not only in nervous and mental diseases but also in physical illness and in the normal stress and strain of life, have been admitted and indeed emphatically asserted by medical practitioners throughout the ages. In recent years it has become ever more apparent that the mere prescription of rest and relaxation is not sufficient: the patient needs to be instructed how to rest and to have both mind and body prepared so that adequate relaxation may supervene. Sedative drugs are sometimes helpful to this end, but all too frequently their ease of prescription conduces to a too extensive or even exclusive use of them, in cases of sleeplessness, excitability, and excessive mental and physical tension.

From my medical experience I believe that the profession is unduly slow to recognise the great therapeutic possibilities of "progressive relaxation," carried out not only according to a scheme of direct instruction, such as Dr. Edmund Jacobson of Chicago advocated some seventeen years ago in his book [1] on the subject, but also in a more general but very effective way which I have practised for the last thirty years, viz., by encouraging the patient to relax his voluntary muscles, starting with the distal muscles of the hands and feet, arms and legs, and on to the muscles of the trunk, head, neck, and face—helping himself in the process by quiet effortless deep breathing. With each expiration the neuromuscular relaxation increases, and it spreads from the voluntary muscles to the involuntary muscles of the respiratory, digestive, and vascular systems, leading ultimately to relaxation in the sympathetic nervous system and relief of emotional and mental tension. With repeated suggestions of relaxation from the physician and perseverance in autosuggestion by the patient himself, the process of relaxation can be greatly speeded up. This use of *suggestion* in producing adequate relaxation is one of my own specific contributions to the method: indeed its effectiveness was experimentally demonstrated by me in a research in the Oxford Institute of Experimental Psychology before the war.[2] A preliminary course of mental analysis, where this is possible, may sometimes be invaluable in preparing the patient for thoroughgoing relaxation and rest.

There is nothing mystical about this method, which is as much physical as psychological, and can be conceived in terms of Pavlov's theory of conditioned reflexes. In the management of my own life I have never found it to fail.

London, W.1. WILLIAM BROWN.

1. Progressive Relaxation. Chicago, 1929.
2. *Brit. J. Psychol.* 1938, 28, 396.

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THE FILM IN MEDICAL EDUCATION

SIR,—As a film-maker who has been concerned with the production of several medical films, I am in complete agreement with Mr. Catterall when he says that 90% of present medical films are useless.

The good film-maker does not expect indulgence—or condescension—either from his audience or from the experts who advise him during production. He is prepared on any particular subject to consult all the best authorities, and to synthesise their opinions. It is right that doctors, whether as audience or advisers, should expect from the film-maker the sincerity and accuracy that they would expect from the author of a textbook.

This does not mean that the film-maker must try to put on the screen *all* the information he is given. His job is to interpret—and sometimes he is making his film for a lay audience, to whom he knows, perhaps better than the expert in the subject, how to talk. But I will challenge our subject experts on such films for lay audiences as *Defeat Diphtheria*, *Life Begins Again* (orthopædic rehabilitation), or *Birthday* (infant mortality in Scotland) to deny that we set ourselves the highest standards of technical accuracy and insisted that our interpretation of the facts they gave us should be cross-checked right to the end. As for films for a technical audience, the outstanding example which Mr. Catterall quotes is the *Techniques of Anæsthesia* series, and these films owe their distinction entirely to the faithful academic approach which the Realist Film Unit made to their problems of interpretation.

It is time for the medical profession to put its foot down. The sycophantic mis-statements of the film paid for by the unintelligent product-advertiser, and the well-meaning filmic ignorance of the enthusiastic amateur, are equally useless. There is a great opportunity in the catalogue of medical films now being prepared by the Royal Society of Medicine in collaboration with the Scientific Film Association. Every available medical film, old and new, is being appraised by a series of ad hoc panels, and rated according to its accuracy and usefulness. This catalogue may well be a forerunner of the new attitude to the use of film in medicine which Mr. Catterall requires.

Documentary Technicians Alliance Ltd., London, W.1. DONALD ALEXANDER.

SIR,—The theoretical possibilities of films in medical education are vast, but the practical probabilities are small. Filming costs money. Amateur efforts cut out the cameraman's wages, the script writer's fees, the editing charges, and so forth, yet amateur film-making involves the layout of large sums of money on equipment and takes up much valuable time of a man who has other work to do. These restrictions make the use of professional film technicians essential if the screen is to be fully exploited in the lecture-room.

Surely the immediate answer is for enlightened or public-spirited bodies and individuals to endow medical teaching films. Why not the Blank Blank Memorial Film on, say, diseases of the brain? I am sure the medical committee of the Scientific Film Association would be happy to advise on subjects urgently needing film treatment, methods of production, costs, &c., and ensure that copies would be available for all who needed them.

London, N.W.8. F. R. KING.

INFUSION INTO THE INTERNAL SAPHENOUS VEIN

SIR,—Mr. Kirkham (Feb. 23) expresses interest in the events which led to the destruction of all the veins round ankles and elbows in the two patients I quoted. One, a girl of 20, had had seven transfusions for recurrent hæmatemesis, and was admitted to our maternity ward with eclampsia. Her veins had been cut and tied simply for transfusions of one or two pints—a practice which persists. The second patient had recurrent papillomata of the bladder, and received intravenous infusions over a long period during various complications and operations. She finally had a two-stage ureteric transplant and total cystectomy; at the end of the second stage she collapsed, which was when I was introduced to her veins. It is probably true that when all the normal channels have been tied, unused channels will sooner or later dilate, and this particular patient has now developed a small vein over the back of one thumb, from which we get blood and through which we have given fluid for an intravenous pyelogram.

By contrast, two other patients under my care have had multiple infusions without losing a single vein. One, with ulcerative colitis, has been kept alive by intravenous therapy through three fulminating attacks, having had infusions, without food by mouth, for an aggregate of 5 weeks. The other, who had fulminating thrombocytopenic purpura, received 20 pints of blood in long-continued drips, and then had a splenectomy. Had we cut down and ligatured each time the vein was changed, these patients might have lost their lives for want of a vein that could be used in an emergency.

With restless patients the cannula part of the Guest needle can be fixed as effectively as a cannula inserted after cutting-down. The wings can be stitched to the skin if desired. With plenty of play for the tubing, and a loop of it strapped to the limb, the cannula is unlikely to be displaced. With uncontrolled patients we usually splint the limb; but otherwise, unless the cannula is inserted over a flexure, splintage is not necessary.

Residents often come here with the same feeling as Mr. Kirkham, that cutting-down is really the simplest and most practicable method, but when they see the residents already here taking the very few seconds necessary for inserting a needle in almost any type of case their standards alter. My thesis is that the right standard reduces cutting-down to a minimum. As a resident, I was fortunate to have my standard set by a gifted R.M.O.; I recently acquired another when I heard of a man who can insert needles into the antecubital veins of newborn infants, which I would not have thought of trying. I have cut and tied all available veins in a newborn infant with erythroblastosis, but a needle into the internal jugular vein is now the rule.

Among 5000 air-raid casualties received at this hospital there were many with whom an immediate cut was indicated; but as each resident's tenure of office proceeded this method was applied with decreasing frequency to collapsed patients. It took one medical officer (with trained nurses to rig the bottles and prepare the limbs) 6 minutes to put up transfusions for 4 exsanguinated patients. I defy anyone to cut down 4 times in that period. With a collapsed patient the internal saphenous at the ankle is not the best route, since its use calls for constant massage, possibly for hours, and pressure on the bottle to get the fluid into the circulation. A vein nearer the heart is much better; and insertion of a needle into the femoral vein below Poupart's ligament is sometimes a valuable, if not an easy, manœuvre.

Cutting-down on a vein is seldom necessary and never desirable.

South London Hospital for Women and Children, S.W.4. MARGARET LOUDEN.

POLYARTERITIS NODOSA AND ARSENIC

SIR,—Almost simultaneously with our report of a case of polyarteritis nodosa following hypersensitive reactions to organic arsenicals (*Lancet*, 1945, ii, 200), thio-urea (Gibson, P. C., and Quinlan, J. T. *Ibid*, 1945, ii, 108) and iodine (Rich, A. R. *Bull. Johns Hopk. Hosp.* 1945, 77, 43) were similarly implicated as possible sources of sensitising non-bacterial antigen in cases of this disease.

The history of a second fatal case of polyarteritis from this hospital demonstrates a similar possible relationship to the administration of organic arsenical drugs.

Following the birth of a congenital syphilitic infant, an airman, aged 34, with a past history of urticaria and eczema, was found to have a positive W.R. in December, 1944. The C.S.F. was normal. From February to May, 1945, he had twelve injections of N.A.B. and bismuth, receiving 5·85 g. of arsenical and 2·4 g. of bismuth in all. In May the N.A.B. was stopped following the onset of severe joint pains, which failed to respond to salicylates, but which improved gradually in the ensuing two months, during which time he was given bismuth alone. From mid-August there was generalised abdominal discomfort and troublesome constipation. The Kahn test remained strongly positive, and on Aug. 21 and 28 he was given 0·3 and 0·45 g. of N.A.B., without immediate reaction. Twenty-four hours after the second injection he began to have constant severe epigastric pain, accompanied

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by anorexia and vomiting. Retrospective inquiry revealed that there were simultaneous aching pains in both legs and flitting arthralgias.

He was admitted to this hospital under the care of Squadron-Leader R. W. Lass, as a possible case of peptic ulcer or gastric carcinoma. Examination of all systems revealed only pronounced loss of weight and generalised epigastric tenderness. Barium meal, gastric analysis, and occult-blood tests proved negative, and his pain became more severe despite treatment, leading to a suspicion of abdominal malignant disease, possibly pancreatic. Tests of pancreatic function proved negative, however; the C.S.F. remained normal, and the E.S.R. was 8 mm. in 1 hr. There was an occasional evening rise of temperature to 99° F. On Sept. 14 he had a generalised epileptic fit followed by severe headache and vomiting. His blood-pressure was found to be 210/120 mm. Hg; the C.S.F. pressure was raised, but the fluid remained normal in composition. Radiological examinations of skull, chest, and abdomen, and blood chemistry gave no clue to the essential nature of the disease, but his white-cell count rose to 10,000 per c.mm. and there were occasional red cells and pus cells in the urine. Within a few days the margin of the left optic disk became blurred and a slit hæmorrhage appeared in the retina. Despite supportive treatment the patient went rapidly downhill. On Sept. 26 he had repeated epileptic fits followed by coma lasting for over 24 hours, and on recovery the knee- and ankle-jerks were found to have disappeared, without sensory loss or diminution of motor power. The E.S.R. was now 45 mm., white cells 32,000, differential count normal. The hypertension and albuminuria persisted. These findings strongly suggested a diagnosis of polyarteritis nodosa, and this was clinched by Squadron-Leader R. S. Sampson, who reported the gradual development of characteristic ocular findings in every way similar to those previously detailed by him in the *British Journal of Ophthalmology* (1945, **29**, 282)—pale perivascular hillocks of choroidal exudate, retinal detachments and hæmorrhages, irregularity in the calibre of retinal vessels, the whole picture variable and culminating in a characteristic "albuminuric retinitis." The diagnosis was confirmed by serial section of a biopsy specimen of calf muscle. Intradermal testing for skin hypersensitivity to N.A.B. and varicus protein antigens gave no positive reactions. Severe cachexia and weakness without anæmia ensued. There was no pyrexia at any time except for two days after the fits of Sept. 26, and death followed on Oct. 30. Autopsy revealed acute and subacute polyarteritis nodosa, involving kidneys, mesentery, peripheral nerves, and skeletal musculature, but sparing the neuraxis.

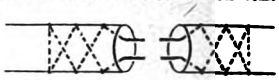
Our attempts to repeat Landsteiner and Jacobs's experimental production of anaphylactic hypersensitivity to salvarsan in animals (*J. exp. Med.* 1936, **64**, 717) have so far failed.

H. G. MILLER,
Princess Mary's R.A.F. Hospital, Halton. M. G. NELSON.

SIMPLE TECHNIQUE OF TENDON SUTURE

SIR,—Suturing tendons is a constant source of anxiety to those who perform it. True, tendons severed at sites where there is no sheath usually heal satisfactorily even in unfavourable circumstances, but the suture of flexors in the hand is always liable to be a failure. The problem of adhesions between tendon and synovial sheath has so far defied complete solution; this no doubt accounts for the large number of different methods advocated. It is being more and more generally accepted that the Bunnel stitch or some modification of it is the most satisfactory method and fine stainless-steel wire the most satisfactory material with which to perform it. The steel, being non-irritating, minimises the chances of adhesion formation. On the other hand, steel wire has certain drawbacks. When threaded on a needle in the ordinary way it can only be pushed through the tendon with some difficulty and thus tends to damage the tendon; being springy and resilient it forms an obtuse loop at the eye. To avoid this the wire is often put into the point of a small hypodermic needle which has been pushed through the tendon where the wire is intended to pass. On withdrawing the needle the wire will follow it through. This method is very tedious and time-consuming; since 10–14 transfixations are required for each severed tendon it can cause considerable delay in multiple suturing.

A combination of the above two methods can avoid the difficulties of each. Its simplicity suggests that it has been used before but I could find no published mention of it. The use of an eyeless needle avoids the damage to the tendon caused by the loop of wire in the needle's eye as well as the fiddling that accompanies the use of a hypodermic needle. In the Bunnel suture (see figure) the ligature traverses the tendon end some distance from its cut surface; each end of the ligature is then worked criss-cross fashion towards the cut surface, through which it emerges. If the wire has an eyeless needle at only one end, the stitch has to be started at the cut surface of the tendon and worked first up, then down. This is not as convenient as when one starts with a transverse stitch half an inch from the severed end of the tendon and goes down with both ends of the ligature. I have therefore had made for me by Messrs. Down Bros. Ltd. some 8-inch strands of 40-gauge stainless-steel wire equipped with a triangular-pointed round-bodied no. 17 straight needle at each end. (A round-bodied needle does less damage to the tendon than a cutting needle.) I use one strand for each half of the severed tendon and approximate the two halves only for the tying of the already inserted sutures. I have found that these strands considerably simplify the technique of suturing.



Royal Infirmary, Preston. P. P. H. SCHMIDT.

CORRECTION OF FACIAL PARALYSIS WITH TANTALUM WIRE

SIR,—I am not surprised that Mr. Clarkson (March 2) takes exception to my statement about the use of tantalum ribbon in dealing with facial paralysis. He finds that fascial strips are still much used in this country. I also so used them, until I found them losing their initial strength, becoming fibrotic, and losing their tensile power. When I became fully satisfied as to this, I sought other means, and have not since used the fascial strips. What I noted was that with the decline of the fascia the ill appearance of the face is gradually renewed. It was to obviate this that new means were sought, and the older method discarded.

May I add that, after a long experience with this work, I have found the temporal muscle superior to the masseter. In fact some of the results with the temporal are brilliant.

The wire does not fragment. It should be inserted deeply, and should be double-knotted with the ends turned inward.

New York. J. EASTMAN SHEEHAN.

INCIDENCE OF SCABIES

SIR,—Some of your readers in the public health services who read the interesting article by Dr. J. L. Burns, M.O.H. for Salford, in your issue of Jan. 26, may wish to have similar independent surveys of the incidence of scabies carried out in the areas under their control. Such a survey might be useful as an additional check on the measures at present in operation. Some of the workers who carried out Dr. Burns's survey are now available to work elsewhere. They were all trained by me personally some years ago and have had considerable experience in the discovery of acari; not having medical or dermatological qualifications, their diagnosis has always been based on this concrete demonstration. They have also quite extensive experience concerning pediculosis.

If any medical officers of health or others are interested in having such a survey carried out they should communicate direct with Mr. H. Garling, 88, Upper Hanover Street, Sheffield, 3. It will be necessary to defray the expenses of the workers concerned.

KENNETH MELLANBY.
London School of Hygiene and Tropical Medicine, Keppel Street, W.C.1.

ERYTHEMA NODOSUM AND SULPHONAMIDES

SIR,—I should like to draw attention to a statement now creeping into medical teaching that sulphonamide drugs can by themselves produce a clinical picture indistinguishable from that of erythema nodosum. I should be glad to know of any direct evidence that this is so; for my experience has been that it is difficult to dissociate the cause of the rash either from the infection

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under treatment at the time, or from a latent sensitivity to tuberculin, as in the Mantoux reaction.

Certain conditions must be satisfied before evidence is accepted as conclusive, and I would suggest that the recurrence of the erythema following re-exhibition of the sulphonamide in a persistently Mantoux-negative patient and in the absence of infection is the only proof that sulphonamides in themselves may produce erythema nodosum. I have had two cases in middle-aged women, both at first suggesting that sulphathiazole was the cause of the eruption, but neither conforming to these conditions.

One was a patient with pneumococcal pneumonia, treated with 30 g. sulphathiazole, who developed erythema nodosum on the fourth day of treatment. A month later she was given 10 g. in twenty-four hours, and thirty-six hours later she showed the characteristic erythema. She was, however, Mantoux-positive in a dilution of 1 in 1000.

The other was a patient with severe β-hæmolytic streptococcal tonsillitis who was given 20 g. of sulphathiazole and developed erythema nodosum seventy-two hours after the initial dose. She was persistently Mantoux-negative (including purified protein derivative 0·005 mg.), but did not develop any skin changes when given sulphathiazole 10 g. a month later.

It seemed to me that in neither of these cases had it been proved that sulphathiazole by itself had caused the erythema; but I should welcome the experience of other clinicians.

Ashford County Hospital, Middlesex. A. BARHAM CARTER.

Public Health

Outlook for the Tuberculous

TUBERCULOSIS workers are concerned, and rightly so, about the welfare of tuberculous patients under the National Insurance Bill.

The social reasons for regarding the tuberculous as a special group among the sick are unassailable; the long course of their illness, the danger they bring to others, and the youth of many at the age of first infection, set them apart from other sick people, and expose them to special hardships in earning their livelihood. Following the advice (or some of it) of the Medical Research Council's committee on tuberculosis in war-time, the Minister of Health in 1943 introduced the money allowances set out in memorandum 266/T.[1] These applied, unfortunately, only to patients with pulmonary tuberculosis who were certified by their tuberculosis officers to be able to return to work after treatment, a distinction which has led to injustice in some cases and unwarranted despair in others. Of two men with similar lesions, responding in a like way to treatment, and occupying neighbouring beds in a sanatorium, one might be receiving benefit while the other might have been classed as incurable. Or a man with a severe lesion—or even a borderline condition—might have lost hope of recovery and hence of any incentive to struggle for it, on learning that he was refused benefit under the scheme. But partial and inadequate as it was, memorandum 266/T did recognise tuberculosis as a special problem, and eased the financial anxiety of the patients who qualified for benefit; and this has meant a greater willingness to accept treatment.

Under the new Bill, however, the original proposals set out in the white-paper of 1944 have been followed with only a few small modifications; and the war-time arrangements of 266/T seem likely to be superseded by the forms of benefit designed to cover all forms of sickness and disability. There will be no additional payments to tuberculous patients through the machinery of the dispensary, and no scheme for subsidising part-time employment during the period of reablement (when tuberculous patients need a high standard of living); moreover, patients will not be entitled to full benefit unless they have paid contributions for three years—a requirement which many young people, at the time of first infection, may be unable to fulfil.

The Joint Tuberculosis Council last year appointed a committee, convened by Dr. C. K. Cullen, to report on the working of memorandum 266/T; and an interim report, completed last July, was published in October. In it were set out the disadvantages of excluding from benefit non-pulmonary cases, and pulmonary cases with a poor prognosis.

The Ministry of Health was asked to consider the experience gained and see what useful improvements could be made on the war-time scheme. The committee thought the basic allowance should be substantially increased, because tuberculosis can be overcome only when the standard of living is reasonably good; and this is as necessary for the protection of the other members of the family as for the recovery of the patient. Even under the war-time scheme there has been a fall in standards in most families. Moreover, the scale of allowances is not such as to induce patients with early symptomless lesions to give up work and be treated. The committee held that no distinction should be made between non-pulmonary and chronic pulmonary cases and curable pulmonary cases. Sick benefit, they thought, should be paid to the patient while he was receiving institutional treatment, and not allowed to accumulate until his discharge, and tuberculous housewives should be allowed to spend more than 10*s.* a week on help in the home if necessary.

Since the appearance of this report, Dr. Cullen has produced a memorandum pointing out that in the new Bill the main changes from the white-paper proposals relating to sick benefit are four:

(1) Benefit at the full rate will continue indefinitely as long as the patient is unfit to resume work, provided he has paid at least three years' contributions.
(2) People with a limited qualification for benefit can requalify for a further period by paying another 13 weeks' contributions.
(3) Some rates of benefit are slightly raised (the standard adult rate from 24*s.* to 26*s.* and that for the first child from 5*s.* to 7*s.* 6*d.*).
(4) Patients may be disqualified from benefit by failure to comply with treatment.

These changes, he thinks, may slightly reduce the number of tuberculous patients needing supplementary assistance, but there is no scheme to cover the special and discretionary payments given under 266/T, nor to supplement part-time wages during reablement, nor to induce people to seek early treatment. In fact tuberculous patients look like being driven back into the anxiety from which some of them had been largely rescued. Their additional needs will have to be met through the new National Assistance machinery to be set up, which may or may not have some of the objections attaching to public assistance in the past. It is to be hoped that the Government will reconsider these drawbacks to the new Bill, bearing in mind that the well-being of tuberculous patients has an important influence on the well-being of the whole community.

1. See *Lancet* 1943, i, 593.

Infectious Disease in England and Wales

WEEK ENDED MARCH 9

Notifications.—Infectious disease: smallpox, 0; scarlet fever, 1137; whooping-cough, 1843; diphtheria, 477; paratyphoid, 16; typhoid, 5; measles (excluding rubella), 1672; pneumonia (primary or influenzal), 849; cerebrospinal fever, 45; poliomyelitis, 7; polioencephalitis, 4; encephalitis lethargica, 2; dysentery, 295; puerperal pyrexia, 127; ophthalmia neonatorum, 57. No case of cholera or typhus was notified during the week.

The number of service and civilian sick in the Infectious Hospitals of the London County Council on March 6 was 1030. During the previous week the following cases were admitted: scarlet fever, 52; diphtheria, 33; measles, 54; whooping-cough, 40.

Deaths.—In 126 great towns there were no deaths from enteric fever or scarlet fever, 2 (0) from measles, 6 (2) from whooping-cough, 10 (1) from diphtheria, 55 (7) from diarrhœa and enteritis under two years, and 112 (18) from influenza.

Manchester and Sheffield each reported 6 deaths from influenza. There were 9 fatal cases of diarrhœa and enteritis at Liverpool.

The number of stillbirths notified during the week was 247 (corresponding to a rate of 32 per thousand total births), including 20 in London.

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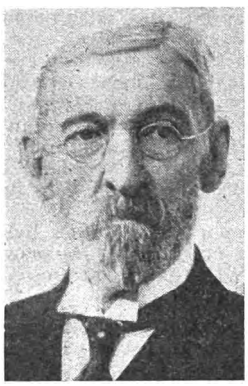
Obituary

SIR JAMES BERRY

KT., B.S. LOND., F.R.C.S., HON. D.C.L. DURH.

Sir James Berry, who died at his home at Roehampton on March 17 at the age of 86, had in his long life won a reputation not only as a surgeon, but also as a traveller, linguist, and archæologist.

His father, Edward Berry, solicitor and ship-owner, had interests in Canada as well as in England, and though James was born at Kingston, Ontario, he was educated at Whitgift School, Croydon. His promise as a student early foretold his future distinction; at St. Bartholomew's Hospital, where he took the conjoint qualification in 1882, he was awarded the Brackenbury scholarship, and in 1885 he graduated B.S., obtaining a university scholarship and the gold medal. In the same year he obtained the F.R.C.S. and the following year was Jacksonian prizeman with his essay on diseases of the thyroid gland. He was also the winner of a surgical prize offered by the Academy of Medicine of Paris. Meanwhile at Bart's he had served as house-surgeon to Sir Thomas Smith, and become surgical registrar. He failed by only a few votes to gain election to the staff, but in 1891 he became surgeon to the Royal Free Hospital and lecturer at the School of Medicine for Women. In the same year he married Dr. Frances Dickinson, sister of Lord Dickinson, and for many years she acted as his anæsthetist. Since 1885 he had been on the staff of the Alexandra Hospital for Diseases of the Hip and he was also surgeon to the Elizabeth Garrett Anderson Hospital.



Press Portrait Bureau

Diseases of the thyroid gland had been the subject of Berry's Jacksonian essay and it remained one of his lasting surgical interests. An acknowledged master of technique, he described his results in his classic monograph in 1901, and other important contributions on the subject were his Lettsomian lectures to the Medical Society of London in 1913 and his Hunterian lecture to the Hunterian Society in 1926. His other specialty was plastic surgery, and in *Harelip and Cleft Palate* (1912) he strongly supported the Langenbeck operation. His many papers were models of thoroughness, lucidity, and surgical sincerity.

For many years Berry and his wife had spent their holidays cycling in the Near East and in North Africa, and early in 1915, with the help of their colleagues at the Royal Free Hospital, they organised a Red Cross unit to go to the help of the Serbs. Their knowledge of the country was invaluable, and to his fluent French, German, and Serbian Berry soon added Magyar. The unit arrived at a lull in the fighting and for a time the surgical team undertook the work of a sanitary corps, teaching the rudiments of hygiene to a people "living on mud floors, disliking fresh air, and consequently suffering much from tuberculosis and diphtheria, careless about water-supply and therefore horribly tormented with worms." The Berry unit soon established a rough-and-ready hygiene, and the hospital conducted a thriving outpatient practice among the peasants. Later the Berrys gave a cheerful picture of this experiment in international amity in their *Red Cross Unit in Serbia* (1916). The unit was captured by the Hungarians but the members were allowed to leave the country and later Berry led another unit to work in Rumania and Russia. For these war services he received the order of the Star of Rumania, of St. Sava of Serbia, and of St. Anne of Russia.

When he returned to England in 1917 he served as surgeon to the military hospital at Napsbury, and later at Bermondsey. He quickly picked up the threads of his London life; in 1921 he became president of the Medical Society of London, in 1925 he was knighted, in 1926 he was elected president of the Royal Society of Medicine, and in 1927 the University of Durham conferred on him the honorary degree of D.C.L. But he was at last able to find more time for his other interests, and studied with zest Roman antiquities in the north of England and took a prominent part in the excavations at Danesborough Camp in Buckinghamshire. In 1938, with Mr. Stephen Lee, he published *A Cromwellian Major-general*, which gives a fascinating account of the career of his namesake, based on contemporary documents.

Sir James married as his second wife in 1935 Dr. Mabel Ingram, who was also a member of the Berry Red Cross unit, and she survives him.

JOHN DAVY ROLLESTON

M.A., D.M. OXFD, F.R.C.P., F.S.A.

In a busy life mostly spent in the infectious diseases hospitals of London Dr. Rolleston, who died on March 13, found time for the wide reading and writing necessary to establish himself as an authority on the history of medicine as well as on the specific fevers. Born in Oxford in 1873, the son of Prof. George Rolleston, the anatomist, and younger brother of H. D. (later Sir Humphry) Rolleston, he was educated at Marlborough and at Brasenose College, Oxford. He did his clinical training at Charing Cross Hospital, qualified in 1900, and took his D.M. in 1904. After house appointments at the Victoria Hospital for Children, Chelsea, he joined the medical staff of the Metropolitan Asylums Board. As assistant medical officer at the Grove Hospital, Tooting, for over twenty years he wrote extensively on pædiatrics and the infectious fevers. He translated Vincent and Muratet's work on typhoid from the French, edited the *British Journal of Children's Diseases*, and was assistant editor of the *Review of Neurology and Psychiatry*. He was an early advocate of the intramuscular injection of serum, and was largely instrumental in introducing the Continental work on precocious paralysis in diphtheria and on erythema infectiosum to the English reader. Of his own observations, those on serum sickness and the prodromal rashes of measles and chicken-pox are perhaps the best known. A long clinical experience led him to question the value of alcohol in illness, and when he was appointed superintendent of the Western Hospital, Fulham, he abolished its use throughout the hospital. The first edition of his textbook, *Acute Infectious Diseases*, appeared in 1925, and was notable for its scholarly presentation and full bibliographies; with Dr. G. W. Ronaldson as co-author, it reached its third edition in 1939. He was elected M.R.C.P. for his published work in 1925, and a fellow in 1931.

After his retirement from active hospital practice, the Royal Society of Medicine claimed much of Rolleston's time; he was at various periods president of the clinical section and the sections of the history of medicine, children's diseases, and epidemiology. Folklore in medicine was his most recent study, and at the time of his last illness he was preparing for the publication of a comprehensive work on this subject, several chapters of which have already appeared in the journals. Rolleston was an inspiring teacher whose experience and erudition were always at the disposal of the aspiring young writer.

He married Mary Edith, daughter of Mr. C. E. Waring, in 1917, and they had a son and a daughter.

R.S.M. MEETINGS ON WAR MEDICINE.—The first of a series of special meetings, organised by the Royal Society of Medicine in collaboration with the medical departments of the three Services and the Medical Research Council, was opened on March 18 by Rear-Admiral Sir Gordon Gordon-Taylor, the president. He explained that the series had been initiated to publicise war developments which were not, as yet, generally known; he hoped that the meetings would prove as fruitful as the monthly inter-allied medical meetings which had been held in London throughout the war. Sir John Anderson, P.C., F.R.S., who took the chair, welcomed the meetings because the public, he thought, had not been as well informed of developments in medicine during the war as of those in physical science. The meetings, details of which appear in the weekly diary, will be continued each afternoon at 5 P.M. until March 29.

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Notes and News

FOOD TABLES FOR THE TROPICS

INTEREST in the nutritional problems of our colonies is radually increasing, and, as the Nutrition Society's recent scussion brought out, these problems are complex but rgent. The Committee on Nutrition in the Colonial Empire, ppointed by the Colonial Secretary, published its report[1] 1939 in which it recommended the setting up of a subcomittee on research, and this in turn proposed that there ould be an organisation for collecting comprehensive data n the nutritional state of the colonial peoples and the influnce on it of economic, sociological, and agricultural factors. survey in Nyasaland was completed in 1940, but from hen until the establishment of the Human Nutrition esearch Unit of the Medical Research Council in 1944 ttle could be done owing to the war. Now the first ublished results of the survey have appeared, and, very gically, these take the form of a set of tables of the nutrional values of tropical foods.[2] The data are chiefly hose collected during the survey but include also those ublished by other workers. That the values given are ncomplete and often uncertain could not be avoided. Many more analyses are necessary before anything like comlete tables can be prepared. With new methods of assay, uch as now exist for many of the vitamins, it should be possible oon to add to and correct the tables. Two features of the eport are the emphasis laid on the correct use and the limitaons of the values given, and the extensive cross-reference to lternative names for tropical foods. It is clear that no eginning can be made in improving the nutrition of the olonial peoples without a knowledge of the nutritive value f their diets, and these tables will be invaluable to all those ho are tackling the job.

PREVENTION OF ENDEMIC GOITRE

A PAPER sponsored by the council on foods and nutrition f the American Medical Association[3] recommends that the Jnited States should adopt for the table and the kitchen a atural salt containing 0·01% potassium iodide or its equialent. The recommendation is based on the successful revention of endemic goitre in West Virginia by the use of n unrefined salt of this composition. The general population, t seems, will take iodised salt only if constantly reminded f its advantages. It is now urged that the term "iodised" hould be abandoned, as suggesting artificial adulteration, nd that propaganda should emphasise the need for a natural alt of standard composition to prevent food deficiencies.

THE SMALLEST TUBE

WHAT is claimed to be the smallest and lightest commercial netal tube in the world has been produced by Accles & Pollock, Ltd., at their Oldbury works. Its outside diameter s 0·006 in. and its bore 0·0035 in.; and 8 miles of it would veigh less than 1 lb. The evolution of this tube has a bearing n the development of stainless steel hypodermic needles.

M.O.I. FILM-OF-THE-MONTH

THE Ministry of Information prepare for general distribuion a monthly documentary film to describe current problems. *It Began on the Clyde*, their monthly release for March, describes he Clyde Basin Experiment. In 1941 war casualties were ower than expected, and E.M.S. hospitals, fully equipped nd staffed, were largely empty. On the other hand, warweariness was already beginning to be noticed and the call-up f doctors starting to make itself felt in domiciliary practice. The Department of Health for Scotland decided to allocate a few beds in an E.M.S. hospital for the investigation of some f Clydeside's civilian sick, recommended by their doctors, nd later the scheme was expanded to include patients on other hospital waiting-lists. Eventually the Clyde experiment covered all Scotland. This film unfolds its story largely hrough the experiences of a single war-worker who is benefiting by the scheme; but although made with care the film is unconvincing, partly because the main actor over-acts his part, and partly because we cannot remember that warweariness in 1941 was as widespread as this film suggests, nd so we lose sympathy with the theme. But the film does put a strong case for a hospital where rest and quiet are considered of equal importance to active therapy, and is welcome on that account. It was made by Greenpark Productions and directed by Ken Anakin; its running-time is 15 min., and it is available from the Central Film Library.

1. See *Lancet*, 1939, ii, 264.
2. Tables of Representative Values of Foods Commonly Used in Tropical Countries. B. S. Platt. *Spec. Rep. Ser. med. Res. Coun., Lond.* H.M. Stationery Office. 9*d*.
3. Kimball, O. P. *J. Amer. med. Ass.* 1946, **130**, 80.

University of Manchester

Dr. J. Crighton Bramwell, who at the end of the present session will complete his period as professor of systematic medicine, has been appointed professor of cardiology from September.

Dr. T. H. Oliver, whose period as professor of clinical medicine will end in September, has been appointed professor of therapeutics from that date.

Dr. G. A. G. Mitchell, now senior lecturer in anatomy in the University of Aberdeen, has been appointed to the chair of anatomy in succession to Prof. F. Wood Jones.

University of Dublin

On March 13 at the school of physic, Trinity College, the following degrees were conferred:—

M.B., B.Ch., B.A.O.—D. C. F. Banks, Jeffrey Davis, Rosamund A. Greening, R. T. W. McCall, Patricia E. V. McFarland, Hugo McVey, Ronie M. M. Maguire, Hannah M. R. Marks, Mary P. Starritt, and W. H. H. Tanner.

M.D.—H. R. Davies, A. F. Kennedy, Sterling Tomlinson, and R. J. Grove-White.

Royal College of Surgeons of England

At a meeting of the council on March 14, with Sir Alfred Webb-Johnson, the president, in the chair, a diploma of fellowship was granted to David Annis.

Diplomas of membership were granted to A. R. C. Butson, Anne Maguire, and Herbert Nussbaum.

Prof. W. E. Gye and Dr. Beatrice D. Pullinger were appointed imperial cancer research fund lecturers, 1946. The reappointment of Dr. G. W. Hayward and Dr. H. K. Goadby as Mackenzie-MacKinnon research fellows was reported.

The appointment of Dr. H. A. Sissons, of Melbourne, as a Prophit research student was reported.

It was decided to hold in the college on April 15–18 an exhibition of the prehistoric skeletons excavated from Mount Carmel before the war.

The following diplomas were granted jointly with the Royal College of Physicians:—

D.O.M.S.—S. C. Appleton, J. R. Ascott, J. E. L. Bendor-Samuel, Kenneth Fawssett, J. D. Fraser, C. M. Heath, F. G. Hibbert, Alexander Lindsay, R. G. Macdonald, Violet M. M. McFarlane, Margaret H. E. Martyn, P. H. Merory, J. C. G. Moore, M. L. Nairac, D. F. Ritchie, Paul Rosefield, Agnes A. S. Russell, Mary Savory, C. M. Shafto, T. E. Shannon, R. E. Smart, and M. W. Smith.

D. Phys. Med.—F. B. Kiernander, John Shulman, and R. J. F. L. Talbot.

External advisers were appointed to assist the selection committees making appointments to the staff at the Middlesex Hospital, St. Bartholomew's Hospital, and the Coventry and Warwickshire Hospital. The appointments concerned are for general, orthopædic, otolaryngological, ophthalmic, and dental surgeons, and for an X-ray diagnostician.

Scottish Statistical Research Bureau

This bureau has been established by the Scottish universities and the Faculty of Actuaries to help those with statistical material which requires analysis. Initially, it will act only on behalf of individuals or groups who approach it through the universities or the faculty. The secretary is Mr. E. Waugh, F.F.A., Faculty of Actuaries, 23, St. Andrew Square, Edinburgh.

British Plastic Surgeons in Yugoslavia

After a preliminary visit last summer by Sir Harold Gillies, an UNRRA team was sent to Belgrade to demonstrate the latest methods in plastic surgery. The work of the team, which includes Mr. James Cuthbert and Dr. Robert Shackleton, is said to have been greatly appreciated, and its stay may be extended beyond the six months originally proposed.

Mental After Care Association

The association's 66th annual general meeting will be held at Burlington House, Piccadilly, London, W.1, on March 27 at 2.45 P.M. H.R.H. Princess Arthur of Connaught will preside, and the speakers will include Dr. Duncan Whittaker and Dr. Henry Yellowlees.

Education for Family Life

The British Social Hygiene Council, in collaboration with other organisations, has arranged a weekend school on this subject, to be held in London on April 27–30. The speakers will include Dr. Charity Taylor, governor of Holloway prison.

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British Association of Physical Medicine

This association has been admitted to the joint secretariat established by the Royal College of Surgeons. Correspondence should be addressed to 45, Lincoln's Inn Fields, London, W.C.2. (Chancery 6965.)

A New Journal

The Association of Anæsthetists is to publish a new quarterly journal, *Anæsthesia*. The editor is Dr. C. Langton Hewer, to whom contributions should be addressed c/o George Pulman & Sons, Ltd., Thayer Street, London, W.1.

An American Appointment

Dr. C. H. Rogerson has been appointed clinical director of the new Seton Psychiatric Institute at Baltimore, which is to be run on the lines of a general hospital with a visiting staff of psychiatric consultants. It will also have a postgraduate training school. For the past nine years Dr. Rogerson has been medical director of the Cassel Hospital.

Argentinian Surgeons' Visit

Prof. Egues, who holds the chair of clinical surgery in the University of Buenos Aires, is visiting this country under the auspices of the British Council. He is accompanied by Dr. Castro O'Connor and Dr. J. L. Curutchet. Outside London, the party will visit Edinburgh, Manchester, Birmingham, and Oxford, between March 25 and April 15.

Luncheon to Professor Monrad-Krohn

Prof. G. H. Monrad-Krohn, F.R.C.P., leader of the Norwegian medical and scientific delegation which lately visited England at the invitation of the British Council, attended a luncheon given in his honour on March 12 by Viscount Davidson, president of the Maida Vale Hospital for Nervous Diseases. Thirty-three years ago Dr. Monrad-Krohn was resident medical officer at this hospital.

Ascorbic Acid for Hospitals

It is announced by the Ministry of Health that the restriction of supplies of ascorbic acid to hospitals, imposed in June, 1944, has now been withdrawn.

Return to Practice

The Central Medical War Committee announces that Mr. A. J. CAMERON, F.R.C.S.E., has resumed civilian practice at 146, Harley Street, W.1, and at 50, Mulgrave Road, Sutton, Surrey.

REFRESHER COURSE FOR ARMY PHARMACISTS.—Pharmacists are now offered a four-weeks' free refresher course before demobilisation from the Army. It is believed that the other Services may soon offer similar facilities.

A medical exhibition is to be organised by the British and Colonial Druggist, Ltd., at St. Andrew's Hall, Glasgow, on June 10–14.

IN the Week's Good Cause on March 31 an appeal for the Home of Recovery for Diabetics will be broadcast by Mr. Basil Henriques. Contributions should be addressed to him, c/o the Diabetic Association, 9, Manchester Square, London, W.1.

Penicillin is now being distributed in vials containing 200,000 units, ½ mega unit, and 1 mega unit, as well as the usual packs of 100,000 units. The Ministry of Health hopes that, for economy, hospitals will accept the larger packs wherever possible.

Addressing the medical group of the Association for Scientific Photography in London on Jan. 24, Dr. B. Richardson Billings suggested that medical photographers, for whom there was an increasing need, might be recruited among commercial photographers, youths of school-leaving age, and those with Service experience of photography. The present lack of suitable training followed by regulated examinations should, he said, be corrected.

Appointments

BREWER, A. E., M.R.C.S.: temp. pathologist, Hampstead General Hospital.
CLEMENT, WILLIAM, M.B., F.R.F.P.S., M.R.C.O.G.: visiting surgeon, Royal Samaritan Hospital for Women, Glasgow.
DICK, G. W. A., M.D. Edin.: pathologist, Uganda.
DICKINSON, JOAN C., M.B. Durh.: temp. asst. M.O.H. (maternity and child welfare), Ealing.
DOUGLAS, JOHN, M.D. Edin., D.P.H.: M.O.H. for Bradford.
GRIFFITHS, MARGARET, M.B. Wales: temp. resident anæsthetist, maternity section, Ayrshire Central Hospital, Irvine.
READ, M. T., M.C., M.R.C.S.: M.O., Nigeria.
WARRACK, JOHN, M.B. Aberd.: M.O.H. for Retford.

Medical Diary

MARCH 24 TO 30

Monday, 25th

ROYAL SOCIETY OF MEDICINE, 1, Wimpole Street, W.1
5 P.M. Air-Commodore P. C. Livingston, Dr. W. S. Stiles: Visual Problems. Surgeon Lieut.-Commander S. C. Suggitt, Air-Commodore E. D. D. Dickson: Auditory Problems.

Tuesday, 26th

ROYAL SOCIETY OF MEDICINE
5 P.M. Mr. Alec Rodger, Lieut.-Colonel A. Torrie, Wing-Commander Denis Williams, Dr. D. Russell Davis: Psychological Problems.
4.30 P.M. *Medicine.* (Middlesex Hospital, W.1.) Dr. A. Laporte: Disorders of the Sympathetic Nervous System.

Wednesday, 27th

ROYAL SOCIETY OF MEDICINE
5 P.M. Surgeon Commander C. L. G. Pratt, Surgeon Lieut.-Commander K. W. Darald, Surgeon Lieut.-Commander F. P. Ellis: Respiratory Problems.
ROYAL INSTITUTE OF PUBLIC HEALTH AND HYGIENE, 28, Portland Place, W.1
3.30 P.M. Dr. J. Browning Alexander: Rôle of Vitamins in the Nutrition of Children.
ROYAL SOCIETY OF ARTS, John Adam Street, W.C.2
5.30 P.M. Sir Jack Drummond, F.R.S.: Famine Conditions and Malnutrition in Europe.
ASSOCIATION OF INDUSTRIAL MEDICAL OFFICERS
3 P.M. *Scottish Group.* (Institute of Hygiene, Glasgow University.) Dr. Myles: Dust Counting.

Thursday, 28th

ROYAL SOCIETY OF MEDICINE
5 P.M. Dr. B. S. Platt, Wing-Commander T. F. Macrae, D.SC., Dr. I. A. Anderson, Dr. J. C. Waterlow, Dr. W. S. S. Ladell: Nutritional Problems.
ROYAL SANITARY INSTITUTE
10.30 A.M. (Town Hall, Bedford.) Dr. G. K. Bowes: Epidemic Disease. Mr. W. H. Norris, A.M.I.C.E.: Design of Relief Sewers.
MEDICO-LEGAL SOCIETY
8.15 P.M. (26, Portland Place, W.1.) Dr. A. Lisle Punch: Tuberculosis and the Law.
CLINICAL SOCIETY, Royal Eye Hospital, Southwark, S.E.1
5.30 P.M. Dr. W. W. Mushin: Anæsthesia for Ophthalmic Operations. Cases at 5 P.M.

Friday, 29th

ROYAL SOCIETY OF MEDICINE
5 P.M. Brig. F. D. Howitt, Group-Captain C. J. S. O'Malley, Lieut.-Colonel A. T. Wilson: Restoration to Efficiency. Films.

Births, Marriages, and Deaths

BIRTHS

ALLEN.—On March 1, in London, Dr. Olwen Allen (née Jones), wife of Major J. A. Allen, R.A.M.C.—a son.
ALMOND.—On March 10, in London, the wife of Dr. R. G. P. Almond—a daughter.
BEDFORD.—On March 11, at Hertford, the wife of Mr. W. Donald Bedford, F.R.C.S.—a son.
DENTON.—On March 8, at Hitchin, Herts, the wife of Squadron-Leader P. H. Denton, R.A.F.V.R.—a daughter.
DICK.—On March 13, at Westbury, Halifax, the wife of Dr. K. S. Dick—a daughter.
HOWAT.—On March 9, in London, the wife of Dr. Douglas D. C. Howat—a son.
HOWITT.—On March 6, at Birkenhead, the wife of Dr. J. S. Howitt—a daughter.
INNES.—On Feb. 27, at Appletreewick, Yorks, the wife of Major A. Innes, M.B.E., R.A.M.C.—a daughter.
LOGAN.—On March 8, in Liverpool, the wife of Dr. Robert F. L. Logan—a son.
SHERRIFF.—On March 13, at Glasgow, the wife of Major J. Munro Sherriff, R.A.M.C.—a son.

MARRIAGES

CARNEGIE—QUINN-YOUNG.—On March 9, at Malacca, David Angus Carnegie, captain R.A., to Barbara Quinn-Young, captain R.A.M.C.
DAVIS—LAWRENCE.—On March 13, in London, George Alexander Norman Davis, captain R.A.M.C., to Betty Lawrence.
GUPTA—COPLAND.—On March 14, in London, Hem Gupta, M.B., to Ida Copland, S.R.N.

DEATHS

BERRY.—On March 17, at Rochampton, Sir James Berry, B.S. Lond., F.R.C.S., aged 86.
BYFORD.—On March 13, at Brighton, William Francis Byford, M.R.C.S., formerly of Ruthin, N. Wales.
CLAYTON.—On March 16, at Edgbaston, Birmingham, John Hazelwood Clayton, M.B. Lond., aged 81.
DICKSON.—On March 13, at Oxford, Sydney James Dickson, M.R.C.S., M.R.C.V.S., aged 29.
GARNER.—On March 16, at Southbourne, Bournemouth, William Langham Garner, M.B. Camb., aged 76.
GIBSON.—On March 12, at Netley Abbey, Louis Percival Gibson, M.R.C.S., formerly of Cowes, aged 81.
KNAGGS.—On March 14, at Cheltenham, Henry Thomas Knaggs, C.B., C.M.G., M.B. Dubl., colonel R.A.M.C., retired.
ROLLESTON.—On March 13, John Davy Rolleston, D.M. Oxfd, F.R.C.P.

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THROMBOSIS

EARLY DIAGNOSIS AND ABORTIVE TREATMENT WITH HEPARIN

GUNNAR BAUER
M.D.

From the Mariestad Hospital, Mariestad, Sweden

BY earlier diagnosis and the use of anticoagulants it should be possible to reduce the mortality from thrombosis of deep veins and consequent pulmonary embolism, which has been stationary for many decades.

It was long believed that thrombosis usually originates in the large pelvic veins or in the upper part of the femoral veins. Of late years, however, it has been shown by many workers that it often starts in the veins of the lower leg. My own investigations have led me to conclude that it almost always arises in the deep veins of the lower leg, and only in about 3% of cases in the thigh or pelvis.

In these studies (Bauer 1940, 1942) I used phlebography. The normal anatomy of the venous channels of the leg was first investigated in over 100 subjects, and fig. 1 is a schematic drawing from the X-ray pictures obtained. Anatomical studies showed that the double fibular vein is by far the most important blood channel from the muscles of the lower leg. In normal phlebograms this vein is seen to be well filled with contrast medium; but when a thrombus is developing in the lower leg the blood containing contrast fluid is unable to flow through the vein, which is no longer visible on radiography (figs. 2 and 5). This opens up the prospect of being able to detect an incipient deep thrombosis at a very early stage.

From combined phlebographic and clinical examination of 150 patients with fresh thrombosis I have reached the following conclusions, since confirmed by Hellsten (1942).

The process begins with formation of a thrombus, for some unknown reason, in a muscle vein. This thrombus projects into the lumen of one of the large venous trunks of the lower leg, and extends through it in the direction of the blood-stream. Even this first, embryonic, stage can be demonstrated in a phlebogram, though it will probably evade diagnosis by other methods.

During the next stage the large veins of the lower leg are progressively filled; the thrombus gradually occludes the entire lumen and becomes attached to the vessel wall. Concurrently there is longitudinal growth up the femoral vein, which will sooner or later contain, freely waving in the blood-stream, an eel-like formation 40–50 cm. long, dark red in colour, and with a slippery surface. The thrombus forms, as it were, a cast of the lumen of the large vein, though it does not completely occlude it; the wall of the vein is as yet not involved in any way, and the thrombus is only anchored at its lowermost end, far down in the lower leg. This condition, which entails great risk of embolism, appears to be commoner than was formerly supposed, and cannot be diagnosed by the ordinary clinical methods; but phlebography helps to detect it.

The waving thrombus, by breaking off at some point or other and floating up towards the heart, may give rise to an embolus. Much more often, however, it grows in thickness, blocks the femoral vein, begins to involve the endothelium, and becomes firmly attached to the vessel wall along its whole length. A typical phlegmasia alba dolens then arises. Phlebography now gives the kind of picture represented in figs. 3 and 6.

Often the thrombosing process extends still further, and invades the pelvic veins; but there may be no prominent clinical evidence of its extension unless this goes so far as to occlude veins essential to life such as the renal and hepatic veins. Not infrequently, too, the process becomes bilateral; but phlebographic evidence suggests that in these cases thrombosis in the second leg always begins in its lower part.

The various stages after the thrombosis has become manifest clinically are well known. The temperature usually falls after a few weeks, and it has been customary to let patients get up when they have been fever-free for about a fortnight. For those who survive, the illness lasts on an average 6–7 weeks. After a further period of convalescence, patients have been allowed to leave hospital, with one or both legs still swollen; and most of them are eventually able to resume their work.

It is now known, however, that even then the disease is not overcome. On the contrary, it passes into a *chronic* stage, and most of those who have suffered from thrombosis have to look forward to serious after-effects. Of these sequelæ our knowledge is regrettably deficient; but Homans (1939) suggested that chronic ulcers on the lower leg are sometimes the result of deep thrombosis earlier, and Birger (1941) thought that at least a third of such ulcers are caused by a pre-existent thrombotic condition.

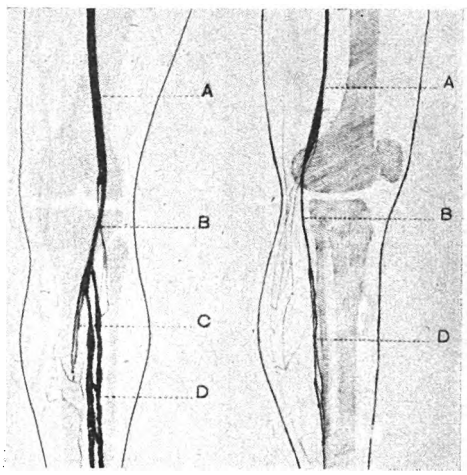

Fig. 1—Normal phlebogram. (I) Postero-anterior view. (II) Lateral view. A, femoral vein; B, popliteal vein; C, posterior tibial vein; D, fibular vein.

My phlebographic studies (Bauer 1942) show that once the deep veins of the leg have been destroyed by thrombosis, recanalisation hardly ever occurs. For the rest of the patient's life the venous blood from the lower leg is drained through an accessory system of subcutaneous veins, usually with the great saphenous vein acting as the chief channel of return (fig. 3). So long as these superficial veins are intact they can transport the blood satisfactorily. But a mild state of venous stasis is always present, causing chronic œdema in the lower leg. Through constant overloading, the superficial veins become distended and tortuous, and the valves defective (fig. 4). Drainage deteriorates, venous stasis is accentuated, and œdema of the lower leg steadily increases, with eventual appearance of leathery indurative lesions.

In the centre of the induration, tissue disintegration usually takes place after two or three years, and a leg ulcer is formed. These ulcers, which have hitherto been attributed to varices, are the result, I believe, in 80–90% of cases, of an earlier deep thrombosis. The term "varicose ulcer" should be changed to "post-thrombotic ulcer."

Of 100 patients showing late thrombosis, all, from the beginning, had swelling of the leg, which if anything increased as the years passed. Five years after the acute stage of the disease 45 had indurative lesions on the lower leg; after ten years 72 showed these changes; and later the number rose to 91. Leg ulcers broke out in 20 patients during the first five years, and in 52 within ten years, and finally 79 had open sores.

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It thus looks as though all patients who suffer from deep thrombosis in the leg have a permanent swelling thereafter, while nine-tenths develop indurative lesions and about four-fifths leg ulcers.

Early Diagnosis

If thrombosis is diagnosed early enough it is possible, with the aid of heparin, to prevent its spread. We have to make the diagnosis at a stage when the condition can be effectively treated before it can give rise to pulmonary embolism or serious local damage.

Till recently this has been difficult. The textbooks provide detailed descriptions of fully developed thrombo-embolic disease, but they contain surprisingly little information on how to detect it in the incipient stage.

Admittedly, thrombo-embolism is a treacherous and incalculable condition: often it seems to come like a bolt from the blue. Nevertheless, if one learns to keep an eye open for slight warning signs, they will be found more often than has been supposed. One such sign is an inexplicable rise in the pulse and temperature. Where, after operation, these have shown the normal downward course, any fresh rise, however small, after the fourth or fifth day, must always awake suspicion. This applies equally to the puerperal woman, and to cases of fracture. Another sign sometimes observed is an unaccountable feeling of uneasiness and restlessness which takes possession of the patient. Or he may say—perhaps not until questioned—that he was kept awake during the night by a faint ache or a feeling of cramp in one of the calves, a symptom which has perhaps already disappeared.

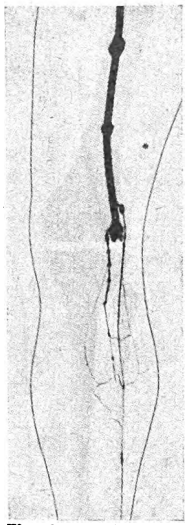

Fig. 2—Incipient thrombosis confined to lower leg. No contrast filling of the deep venous trunks of the lower leg. Only a few fine, superficial veins are visible.

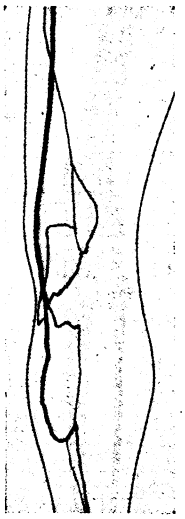

Fig. 3—Thrombosis of deep venous trunks in both lower leg and thigh. Relatively early. Well-developed compensatory drainage from lower leg. Great saphenous vein straight and large. Superficial veins in lower leg relatively fine, and not tortuous.

Complaint of even a slight pain or stitch in the chest must give rise to a strong suspicion of pulmonary infarction, and this will of course be supported if the patient develops an irritative cough or has sputum streaked with clear red blood. It is now more widely recognised that the majority of the "lung complications" that are seen after operation or childbirth, and in people confined to bed for reasons other than old age, are due not (as was previously believed) to bronchopneumonia but to the presence of pulmonary infarcts, large or small, and are thus the result of thrombosis somewhere in the peripheral parts of the body.

If any of these general signs are observed, a thorough search must be made for the cause. The first step is to examine the patient's legs, and in particular the calf region, for local signs of thrombosis. It is by no means sufficient to pass the hand rapidly over the leg, without removing the coverlet; a complete inspection and palpation must be carried out. Conspicuous signs cannot be expected; indeed, if they are found, one may be sure that it is already too late. But in early cases one may note slight swelling of the lower leg, an increased glossiness and tension of the skin, a faintly cyanotic discoloration in comparison with the other leg, and finally a larger and bluer appearance of the superficial veins on the one leg than on the other. These signs need not necessarily be present, but if even one of them is observed the probability of an incipient thrombosis is considerably increased.

For palpating the back of the lower leg, the muscles should be relaxed, and this is best achieved by making the patient bend his knees and plant his feet flat on the underlying support. If palpation is then done from the back, through the calf musculature and in towards the space between the tibia and the fibula, and the fingers are moved gradually upward from the upper end of the Achilles tendon to the popliteal fossa, the patient may say that he has tenderness over a short stretch of the leg. Such tenderness will be the more significant if none is noticed when the muscles at the same level are pressed together from side to side. A definitely increased consistence in the musculature is another not unusual feature of thrombosis. Finally, the patient should be asked to extend his legs again, and his foot is dorsiflexed, when pain may be felt at the same spot as the tenderness experienced on direct pressure.

If one or more of these signs be discovered, incipient thrombosis is extremely likely but not certain. In point of fact, in the experience both of Hellsten and myself, radiography will reveal that in at least one-third of them there is no thrombosis at all. Doubt, however, does not justify delay to see whether the signs become accentuated; for if thrombosis is really present every hour is valuable.

PHLEBOGRAPHY

Fortunately we possess a means of making certain. If the deep blood-channels of the lower leg can be seen only in part, or are entirely absent in the phlebogram (fig. 2), the diagnosis of thrombosis is immediately established. The technique (Bauer 1942, Hellsten 1942) is exceedingly simple:

1. The patient lies supine on the operating-table. A cassette 40 × 50 cm. is placed with one of its halves (20 × 50 cm.) under the affected leg with the lower edge about 8 cm. above the malleolar plane. The other half of the cassette is covered with a lead plate. A wooden block about 6 cm. in height is placed under the patient's heel. The leg is rotated 45° inwards and fixed in this position by an assistant, who holds the patient's foot.
2. A rubber tube is placed round the leg just above the malleolar plane and is drawn tight with about the same force as is used in venepuncture of the arm.
3. The X-ray tube is adjusted over the middle of the film-half that is to be exposed.
4. Under local anæsthesia an incision 1–2 cm. long is made 1 cm. behind the outer malleolus and parallel to the latter's edge. A vertically running, rather thick vein is found under the skin. It is isolated for a stretch of 1–2 cm. and is lifted up by means of a silk thread, on which a loose knot is made.
5. The vein is punctured with a syringe containing 20 c.cm. of 35% 'Perabrodil' and fitted with a fine needle, with its point bevelled at rather an obtuse angle.
6. A few drops of the opaque medium are cautiously injected to make sure that the passage is free. If this is so, the silk thread is drawn tight around the vein and the needle lying in it.

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7. Injection is commenced. An assistant with watch in hand reads off every 5 seconds that pass.
8. The injection is performed as uniformly as possible. It is so regulated that 3–4 c.cm. still remains in the syringe when the 50th second is announced.
9. The radiographer makes the exposure at the moment the 50th second is announced.
10. The surgeon continues the injection at the same rate as before.
11. The radiographer moves his tube as rapidly as possible to the inner side of the leg and directs the ray in a horizontal direction. Simultaneously, an assistant slips the cassette from under the patient's leg, raising it to a standing position on the outer side of the leg and shifting the lead plate to the other half of the cassette.
12. As soon as this change-over has been effected, which usually takes 15–20 seconds, another exposure is made while the last drops of the opaque solution are flowing in.
13. The needle-point is withdrawn. The silk thread is removed. Only extremely slight bleeding occurs. As a rule, no ligature of the vein is required. Cutaneous suture.

In my opinion this type of examination ought to be adopted in all hospitals, and immediately applied whenever there is the slightest reason to suspect thrombosis. Where practitioners encounter such cases in domiciliary practice, it is naturally for them to decide whether heparin treatment should be undertaken in the home on the mere suspicion of thrombosis, or whether the patient should be sent to a hospital for phlebography. According to my experience, there is no great risk involved in transporting such patients. The only dangerous action is to do nothing.

It goes without saying that the head of a large hospital section will be unable to give all his patients such detailed attention that he can discover every sign likely to indicate an incipient thrombosis. He must rely for this largely on his house-surgeons—and why not also on the nurses?

Incidence and Mortality

Though the surgeons were perhaps the first to have unpleasant experiences with thrombo-embolic disease, and were the first to give it systematic study, the disease finds victims among patients compelled to lie in bed for any reason whatsoever.

AFTER SURGICAL OPERATIONS

The incidence after surgical and gynæcological interventions will vary according to the age of the patients,

TABLE I—THROMBOSIS AFTER SURGICAL OPERATIONS: INCIDENCE AND MORTALITY

Author	Place	No. of operations	Thrombosis		Fatal pulmonary embolism	
			No. of cases	% of total	No. of cases	% of thrombosis cases
Braun (1939) ..	Cologne	12,510	89	0·71	21	23·6
Ranzi and Huber (1935)	Vienna	47,140	595	1·28	120	20·2
	Innsbruck	59,342	721	1·2	134	18·6
Giertz and Crafoord (1928–29)	Mörby, Sweden	7,824	239	3·1	38	15·9
Linde (1941) ..	Stockholm	11,401	259	2·3	41	15·8
Nicolaysen (1931–32)	Norway	21,867	335	1·53	30	9·0
Dahl-Iversen and Ramberg (1932)	Copenhagen	18,168	636	3·5	95	14·9
		178,252	2874	1·61	479	16·6

the type of operation, the surgeon, and the hospital, and it differs in different countries and even in different parts of the same country. Table I, based on fairly recent compilations from clinics on the Continent and in Scandinavia, shows that thrombosis developed in 1·61% of about 180,000 cases, which gives at least an approximate idea of its postoperative frequency.

Among the 2874 cases of thrombosis shown in this table, there were 479 cases of fatal pulmonary embolism, which means that the fatality-rate among the thrombosis patients was 16·6%. The 479 deaths after 178,252 operations represents a mortality of 0·26%. This figure agrees closely with the one reached by Robertson (1938), who assembled from the entire surgical literature between 1913 and 1931 a series of 2,196,841 operations, with 5931 deaths from pulmonary embolism—giving a postoperative case-mortality of 0·27%.

Perhaps we should be justified in saying that on the average thrombosis develops in every 60th patient undergoing operation. Of those developing it the proportion dying (in the absence of heparin treatment) is about 1 in 6. Thus of every 400 patients operated upon 1 has died from embolism.

FOLLOWING PARTURITION

In the puerperium thrombosis is less common and takes a milder course than after operations, this no doubt being due to the lower age and greater resistance of the patients. In table II, as in table I, the incidence

TABLE II—INCIDENCE OF THROMBOSIS IN PUERPERIUM

Author	Place	No. of deliveries	Thrombosis	
			No. of cases	% of total
Holzmann (1924) ..	Zurich	34,041	211	0·62
Mikuliz-Radecki (1941)	Königsberg	16,482	355	2·15
Braun (1939)	Cologne	20,674	183	0·89
Nettelblad (1931) ..	Southern Matern. Hosp., Stockholm	51,059	434	0·85
Hellsten (1942)	General Matern. Hosp., Stockholm	36,180	420	1·16
Nürnberger (1934) ..	German clinics	170,072	2411	1·30
		328,508	4014	1·2

figures vary rather widely, but if the whole series be added together it will be found that among 328,508 deliveries there were 4014 cases of thrombosis, or 1·2%. The figures are so large that this proportion may be considered correct.

Some conception of the number of fatal cases may be gained by adding together the figures quoted by Holzmann, Mikuliz-Radecki, Braun, Nettelblad, and Hellsten. Among these 1603 cases of thrombosis there were 57 deaths, or 3·6%. It will be seen that this is between a quarter and a fifth of the fatality-rate for postoperative thrombosis.

The probable mortality from pulmonary embolism among women in childbed can also be readily worked out. Among 158,436 patients, the complication was encountered in 57, making a mortality of 0·036%. In a still larger series from German clinics, published by Nürnberger (1934), and comprising 201,824 deliveries, a fatal embolism occurred in 74 patients, or 0·03%.

Judging by my experience, these figures are on the low side. The thrombotic process often does not manifest itself in the short time women are now kept in hospital, and is accordingly not mentioned in the records of the hospital. With this reservation, the following conclusions may be drawn from the material cited. Among all deliveries, every 80th woman, on an average, gets thrombosis. Of these, in the absence of heparin, the proportion dying is not quite 1 in 25. Thus after parturition deaths from pulmonary embolism were at least 1 in 3000.

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IN PATIENTS WITH INTERNAL DISEASES

There is reason to think that hospital physicians do not yet appreciate how common thrombosis is in their wards, and the same may be said of general practitioners concerning patients in bed at home. Thus the *Journal of the American Medical Association* (1940), stating that pulmonary embolism has long been overlooked both in the wards and in general practice, refers to an analysis of the autopsy material at the Massachusetts General Hospital which revealed that the symptoms of pulmonary embolism were often attributed to bronchopneumonia, atypical pneumonia, cardiac insufficiency with pulmonary stasis, or cardiac infarction. Of the cases of pulmonary embolism proved at autopsy 60% came from the medical wards of the hospital.

The literature of this subject is deficient. Singer (1929), however, reports that in the Leipzig clinic (1912–13, 1926–28) among 34,098 cases of internal disorder, 740 cases of thrombosis were observed—an incidence of 2·1%. Of these, 143 were fatal, which gives a case-mortality of 19% for thrombosis and a mortality of 0·4% from pulmonary embolism in the whole group of patients.

Of 804 cases of thrombosis observed in ten of the largest general hospitals in Sweden in 1939, 448 (56%) were in general medical wards. Of these, 79 died, giving a case-mortality of 18% from thrombosis.

These figures do not permit any exact estimate of incidence; but they suggest that both thrombo-embolism, and its fatal complication pulmonary embolism, occur at least as often in the medical as in the surgical wards.

TABLE III—INCIDENCE OF THROMBOSIS, AND CASE-MORTALITY IN CERTAIN GROUPS

Group	Incidence %	Case-mortality (%)	Total mortality from thrombo-embolism
After surgical operations ..	1·61	16·6	0·26
After parturition	1·2	3·6	0·033
Medical cases	(2·1)	(19·0)	(0·4)
After injury of lower limb	(14·8)	..	..

Figures in parentheses are approximate.

IN ASSOCIATION WITH INJURY OF LOWER LIMBS

There is another group of patients in whom thrombotic complications are, I believe, far commoner than has so far been recognised—namely, those confined to bed by injuries to the lower limbs, especially the lower leg. Of a series of 120 cases of thrombosis treated at the Mariestad Hospital, in which investigation was particularly thorough, the causal factor in 32 (more than a quarter) appeared to be trauma of the lower leg, sometimes severe but often relatively mild. In two years, excluding pure foot injuries, 182 patients were admitted suffering from injury to the lower leg, and thrombosis developed in no less than 27 of them—14·8%, or 1 in 7. The risk of thrombosis may thus be something like ten times as high in these cases as it is after operation. The reason why this important fact has had so little attention lies presumably in the difficulty of diagnosing thrombosis, especially in its incipient stage: the signs may easily be swamped by those of the fracture or other injury. Here phlebography is likely to be especially useful.

Vance (1934), reporting on 50 cases in which fatal pulmonary embolism followed trauma, noted that this serious complication arose not only after serious fractures but sometimes after relatively slight damage. His 50 cases included 11 in which the tibia and fibula were both fractured; 2 with fracture of the tibia alone; 7 with fracture of the fibula alone; 5 with mere contusion of the leg; 3 with lacerated wounds; 1 with a "sprained ankle"; and 1 with traumatic arthritis of the knee. In only 1 of all these cases was thrombosis diagnosed before the fatal pulmonary embolism.

TENTATIVE CONCLUSION

Assembling all these figures (table III) we get an idea of the incidence of thrombo-embolism in a number of important groups. Their application to the population as a whole has been studied by Jorpes (1943a). Basing his calculations on official reports to the Medical Board, he estimates that the incidence of thrombo-embolism every year in Sweden is about 0·8 per 1000 of population. This figure is probably applicable to most other civilised countries.

TABLE IV—HEPARIN TREATMENT OF THROMBOSIS AND PULMONARY EMBOLISM DURING FIVE YEARS AT THE MARIESTAD HOSPITAL, SWEDEN

—	1929–38 Conservative treatment	Oct. 1, 1940–Sept. 30, 1945 Heparin treatment
Patients	25,628	16,495
Thrombotic cases	264	209
Fatal pulmonary embolism ..	47	3
Mortality among thrombotic cases	18%	1·4%
Average stay in bed	40 days	4·7 days
Post-thrombotic sequelæ ..	Serious	None; or very slight

Effect of Heparin Therapy on Case-mortality

The above figures give some idea of the situation before heparin was introduced. As soon as this physiological anticoagulant of Howell was produced in pure form hopes were aroused of using it against thrombo-embolic disease. Both at Toronto, where Charles and Scott (1933) had improved its extraction from ox liver, and in Stockholm, where Jorpes (1935) had cleared up its chemical nature, experiments were made to this end.

Its prophylactic use was first tried by Crafoord (1937) in collaboration with Jorpes, and the results of Crafoord (1939), Crafoord and Jorpes (1941), and Wetterdal (1941), as well as those of Murray (1940, 1941) at Toronto, have proved that it will prevent thrombosis.

TABLE V—EFFECT OF TREATMENT WITH ANTICOAGULANTS ON THE COURSE OF DEEP VENOUS THROMBOSIS AND PULMONARY EMBOLISM. FIGURES FROM 19 SWEDISH CLINICS FOR 1940–44 (ZILLIACUS 1946)

A = Ordinary leg thrombosis.
B = Non-fatal sudden pulmonary embolism.
C = Sudden fatal pulmonary embolism.

Treatment	Cases	Pulmonary embolism	Deaths	Stay in hospital because of thrombosis (days)	Thrombosis spreading to second leg
No specific treatment:					
A	214	60	20	35	66
B	63	Repeated attacks	19	..	..
C	114	..	114	..	..
Heparin treatment:					
A	342	6 (23)*	(2)		5
B	71	(8)	..		..
Heparin + dicoumarol:				8–11	
A	103	..	..		..
B	16	..	..		..
Dicoumarol:					
A	131	2 (5)	1		1
B	16	..	..		..

* The figures in parentheses indicate an embolus or death occurring before, or late after, commencement of specific treatment.

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Prophylactic treatment, however, cannot be applied on any large scale. The price of the drug is high, and the repeated intravenous injections required would put too great a demand on the hospital staff. In medical cases there would be no means of knowing at what stage the treatment should be undertaken, and even if heparinisation were limited to patients who had just undergone an operation, or parturition, we should nevertheless be aware that some 98% of them would in any case have recovered without thrombotic complications. Moreover, heparinisation just after operation is not without its dangers, in that postoperative hæmorrhage has been reported. Hence in future the prophylactic use of heparin will probably be reserved for cases in which the risk of thrombo-embolic complications is considered particularly great—e.g., after parturition when there has been a thrombosis during pregnancy, or after operations on patients who have previously had thrombosis repeatedly. Our ability to prevent new thrombotic processes now renders it practicable, also, to attempt operations on patients already displaying signs of thrombosis.

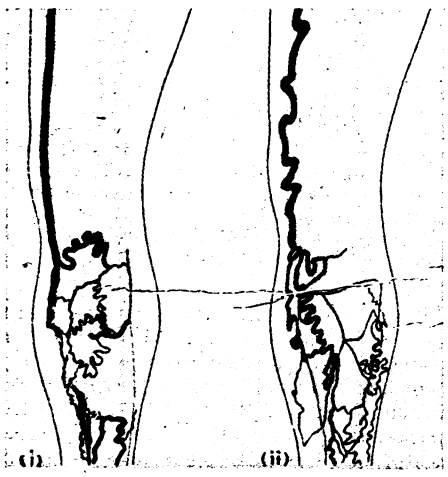

Fig. 4—(i) Chronic thrombosis of long standing. Advanced degeneration of superficial veins of lower leg. Great saphenous vein still straight. Swelling and induration. (ii) Chronic thrombosis, still older. Degeneration and tortuousness of great saphenous vein. Swelling, induration, and ulceration.

Luckily, however, it is now possible to derive the full benefit from heparin without using it as a prophylactic. As a rule we can, without undue anxiety, wait until the patient actually displays signs of thrombo-embolism.

The first attempts at treatment were rather tentative. Crafoord (1941) tried it side by side with his prophylactic series. Murray (1939, 1940), who had used the drug for prophylaxis, reported in a Hunterian lecture to the Royal College of Surgeons in June, 1939, 50 cases of thrombophlebitis and 22 cases of pulmonary embolism successfully treated. In Stockholm the heparin produced by Jorpes has been on the market since 1937, and extremely favourable reports were made by Clason, Wetterdal, Crafoord, and others in December, 1940 (Swedish Society of Surgeons, &c., 1941).

On the same occasion I made suggestions (Bauer 1941a and b) for the rational approach to the problem, including (1) diagnosis at the earliest possible moment; (2) immediate institution of heparin therapy in accordance with a definite schedule; and (3) treatment with movements at an early stage. I had concluded that the very earliest stages of this disease could be diagnosed by phlebography, and it now appeared that if such early cases were treated with heparin, the course of the disease could be rendered much shorter, and risk-free. In fact the term *abortive treatment* could be applied (fig. 5). The acute symptoms —a rise in temperature, swelling, tenderness, and pain in the leg—were seen to disappear within a surprisingly short time. I also insisted that movements of the legs should begin almost immediately, and that as soon as the acute signs had subsided the patient should get up.

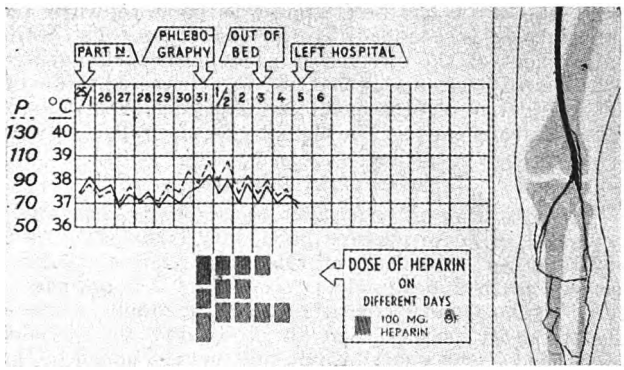

Fig. 5—Example of abortive treatment with heparin. On 6th day after normal delivery, rise in temperature and pulse-rate, and slight tenderness on palpation over middle third of calf. On phlebography, no contrast filling of deep veins of lower leg, but femoral vein normal: incipient thrombosis, still confined to lower leg.

Heparin treatment instituted. First day, 150+100+150 mg. of heparin. Second and third days, 100 mg. three times a day. Then successively reduced doses. Total dose of heparin, 1300 mg.

On third day all tenderness disappeared and temperature normal. Patient allowed up. On fifth day patient discharged after being supplied with an Unna's paste stocking.

These suggestions were adopted by a number of Swedish surgeons and gynæcologists (e.g., Hellsten 1942).

At the Mariestad Hospital I have used the method, without alteration, for five years (table IV). As may be seen from this table, my cases amount to 209. Among these, there have been only 3 deaths. One occurred in February, 1941. This was in a patient who already had advanced thrombosis when admitted to the hospital, and the heparinisation was not carried out entirely in accordance with the principles which we now know to be correct. The second was a case of a superficial thrombophlebitis, which spread to the deep veins. The patient did not receive any heparin before the fatal embolism. I should add that during this period no death has occurred as a result of pulmonary embolism in a patient in whom thrombosis had not been previously diagnosed. The series thus shows that early diagnosis and heparin treatment can rid a hospital section from the dangers of thrombo-embolism.

PHLEGMASIA ALBA DOLENS

Naturally one is bound to see, from time to time, patients in whom phlegmasia alba dolens has already

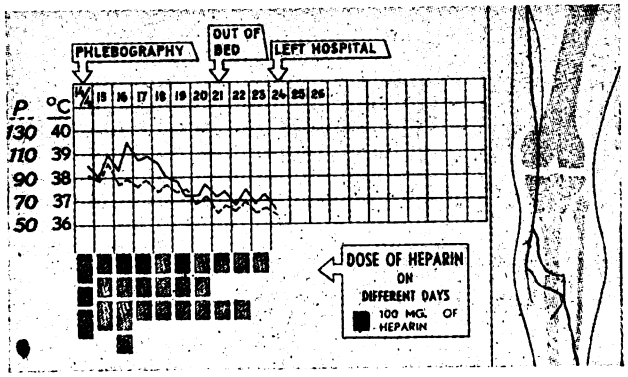

Fig. 6—Example of heparin treatment in phlegmasia alba dolens. Patient treated at home for post-partum thrombosis. After a few days pulmonary embolism of medium severity developed; on admission to hospital, condition poor; dyspnœic and very restless. Severe phlegmasia alba dolens in right leg. Phlebography showed total absence of all deep venous trunks: incipient thrombosis in both lower leg and thigh.

Heparin treatment instituted. First days, doses large; after that successively reduced. Total heparin dose, 3000 mg.

Stitch and restlessness disappeared after first injection. After two days, during which temperature continued to rise, the fever rapidly subsided and all local symptoms disappeared. On seventh day patient could get up. On tenth day discharged with only minimal signs of leg swelling.

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developed: usually these have been ill in their homes. But the effect has been almost as good as when the thrombosis is confined to the lower leg. The swift abatement of the swelling is particularly striking, and the course is often abortive (fig. 6). There is, however, a greater risk of subsequent complications than in cases treated really early. The heparin has, after all, been used too late.

PULMONARY EMBOLISM

Heparin therapy has also been found surprisingly effective in acute massive pulmonary embolism. As is well known, embolism of this type relatively seldom causes death immediately. As a rule ½–2 hours pass—the dyspnœa and cyanosis becoming gradually worse—before death ensues. In all probability the embolus does not, at the start, entirely obstruct the lumen of the pulmonary artery, but it forms a starting-point for the deposition of fresh thrombotic masses, which eventually cause complete blockage. If such deposition can be prevented, the circulatory disturbance gradually rights itself and the patient survives. This is probably what happens when heparin in large doses is administered in this condition: within a very short time the threatening symptoms show a change, and the dyspnœa and stitch disappear. All the patients to whom there has been time to administer heparin have reacted in this manner, and within a few days they were symptom-free and able to get up. Only a temporary area of increased radiographic density in one lung bears witness for a time to what has happened. In cases of this kind, nothing can replace heparin, with its capacity for instantaneous action. Dicoumarol, which only takes effect after 24 hours at the earliest, is valueless here.

TABLE VI—CASE-MORTALITY FROM THROMBOSIS WITH AND WITHOUT HEPARIN

Treatment	No. of thrombosis patients	Deaths	Case-mortality %
Without heparin			
Postoperative (table I)	2874	479	16·6
Obstetrical and gynæcological (table II) ..	1603	57	3·6
With heparin			
Surgical and obstetrical	841	5	0·8

COMPARISONS

The results achieved with heparin in Sweden have recently been discussed in a thesis by Zilliacus (1946). He studied the case-reports from 19 clinics for 1940–44, including the material of Hellsten, Crafoord, and Wetterdal but not that of the Mariestad Hospital. He collected all cases of deep venous thrombosis in the legs. He found 790 such cases and 280 cases of pulmonary embolism without other signs of thrombosis. His results are summarised in table V.

Thus among 277 conservatively treated cases of deep venous thrombosis or pulmonary embolism there were more than 60 cases with complicating pulmonary embolism, 66 cases with spread of thrombosis to the second leg, and 39 deaths; whereas in 679 cases treated with anticoagulants embolism followed in only 8 (+36), with spread of thrombosis to the other leg in 6, and death in 1 (+2). Of the 622 cases treated with heparin at the Mariestad clinic and in Zilliacus's material, and the 119 cases given heparin and dicoumarol, only 5 (0·8%) died. As to the sequelæ following deep venous thrombosis, Zilliacus's findings were similar to those at the Mariestad clinic.

The number of thrombosis patients treated with heparin is not yet large; but we may perhaps permit ourselves a preliminary comparison with previous series (table VI). Whereas the case-mortality was around 16·6% in a large series of postoperative thrombosis, and 3·6% in obstetrical patients, when heparin was not administered, the death-rate in a mixed series of surgical and obstetrical patients treated with heparin has been reduced to 0·8%.

Effect of Heparin Therapy on Duration of Recumbent Period and Stay in Hospital

Apart from its mortality, thrombo-embolism is serious because it causes patients to stay in bed far longer than is otherwise necessary. A few authors, it is true, have in recent years advocated early movements and early rising from bed even in permanent and well-developed thrombotic conditions (Barker and Counsellor 1939, Fischer 1940, Haase 1940, Bahls 1940). In general, however, the profession has held fast to the opinion of Morawitz (1934): "Je weniger aktiv die Therapie um so besser. Viel Geschäftigkeit schadet, Ruhe ist bisher das Beste." Even when it was felt to be desirable, the patient could not possibly leave bed because of the tenderness and pain in the affected leg. It has been the custom to keep him recumbent for at least a fortnight after the disappearance of the acute symptoms and the temperature peak.

In Nettelblad's series, the stay in bed was prolonged beyond the normal time, in cases of deep venous thrombosis, by 43 days (98 cases), and in pelvic thrombosis by 49 days (13 cases). In the series of Linde (1941), comprising 259 surgical cases, the recumbent period was 55 days, against 17 days in patients with no thrombosis. In that of Hellsten (1942), comprising 420 obstetrical patients with thrombosis, the corresponding average was 55·2 days, and in the compilations made by Dahl-Iversen and Ramberg (1932) in respect of 636 surgical patients with thrombosis the average time was 30 days. The time has been calculated from the day of parturition or of operation.

These figures indicate that when conservative treatment was employed the effect of thrombosis or embolism was to prolong recumbency, on the average, by about 6 weeks. In contrast, among the 209 thrombosis patients receiving heparin at the Mariestad Hospital, the recumbent period due to thrombosis—i.e., the period between diagnosis of thrombosis and the time when the patient got up—was, on the average, not quite 6 days. For Hellsten's 95 thrombosis patients it was about 8 days. Other authors have not yet published exact figures, but it seems as though, as in Murray's cases (1940, 1941), it can only be a matter of a further 1 or 2 days.

Thus it looks as though the period of recumbency enforced by thrombo-embolism can be reduced by the use of heparin from about 6 weeks to not much more than 1 week. I need hardly stress the social significance of this reduction, in terms of hospital expenses, increase of available beds, and earlier return to work.

Effect of Heparin Therapy on Sequelæ

I have already said that formerly almost every patient who survived thrombo-embolism had a swollen leg for the rest of his life, that in more than nine-tenths of them indurative lesions also developed on the lower leg, and that typical leg ulcers appeared sooner or later in about four-fifths. These affections naturally cause much discomfort and pain and carry a risk of infection. Actually, if thrombo-embolism is responsible in most cases for the leg ulcers and indurations so often seen in the middle-aged and old, it must be one of our main disabling diseases. Birger (1941) has shown that in Sweden leg ulcers out-distance, as a cause of disablement, diabetes and tuberculosis of bones and joints: on a rough estimate there are in Sweden alone between 10,000 and 30,000 persons with leg ulcers, whose care consumes considerable sums of money each year.

It should be possible, however, to change this state of affairs with the aid of heparin. In investigations on thrombosis sequelæ (Bauer 1942) I found that the cause

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of the severe post-thrombotic circulatory disorders in the lower leg was destruction of the popliteal vein by the thrombosing process. When the popliteal channel is closed the transport of blood from the lower leg is taken over by the great saphenous vein—the only remaining vein of any consequence passing the level of the knee-joint. This vein, however, has only a small part of the capacity of the popliteal vein, and sooner or later it gives way. In cases of thrombosis, therefore, the fate of the lower leg depends on our being able to check the thrombosing process before it invades the popliteal vein. With conservative methods this was seldom possible: indeed, according to the evidence I collected, the thrombosis spread within a short time to the thigh in 85–90% of the patients. Since heparin has come into use, however, clinical and phlebographic observations have shown that it can stop the growth of the thrombus, and thus fix the whole process at the level reached when the treatment begins. If thrombosis can be diagnosed while still confined to the lower leg, the popliteal vein is likely to be saved and serious after-effects avoided.

This presumption is supported by the results assembled in table VII. The period of observation is still rather short, and it is only after the patients have been observed for 5–10 years that one will be justified in making general statements. Nevertheless the difference between the two groups is striking, and suggests that we have found in heparin an effective means of preventing post-traumatic swelling, indurations, and leg ulcers.

TABLE VII—THROMBOSIS LOCALISED TO LOWER LEG. COMPARISON OF RESULTS UP TO 3 YEARS. (After Bauer 1942)

Symptoms and signs		Non-heparinised (19 cases)	Heparinised (38 cases)
Swelling	None	..	30
	Mild	..	8
	Severe	19	..
Induration	None	5	38
	Mild	9	..
	Severe	5	..
Ulceration	Absent	16	38
	Present	3	..
Heaviness in leg, pains	Absent	1	36
	Present	18	2

In this respect it clearly surpasses other anticoagulants. Dicoumarol, for instance, according to Prandoni and Wright (1942) and others, has no effect until 24–72 hours after administration, by which time a thrombosis originally confined to the lower leg has usually spread to the thigh.

Technique of Heparin Treatment

At the Mariestad Hospital we use heparin made in Stockholm by Vitrum & Co. Ltd., under the supervision of Dr. Jorpes, and give it by intermittent intravenous injections. One mg. of this heparin contains 80 provisional international heparin units.

As soon as thrombosis (or pulmonary embolism) is diagnosed 150 mg. of heparin is injected. Depending on the time of day at which the diagnosis is made, a further one or two doses of the same size are given; but four hours must elapse between them. The last dose is given late at night. On each of the following days three to four injections, each of 100 mg., are usually given, the last evening dose, if desired, being increased to 150 mg. After a few days the temperature generally returns to normal (or almost normal), and the swelling and palpation tenderness in the leg disappear. The heparin doses can then be decreased to two injections of 100 mg., and on the last day to an evening dose alone. The treatment is then at an end (fig. 5). Throughout its course the patient is allowed to move freely in bed and is made to bend and stretch the legs at intervals during the day. On the day the heparin doses are first decreased he is permitted to get up and even to walk about a little. The length of time out of bed is increased each day, and as a rule he can leave hospital two or three days after getting up.

When he first leaves bed he is provided with an elastic bandage on the foot and the lower leg, in order to

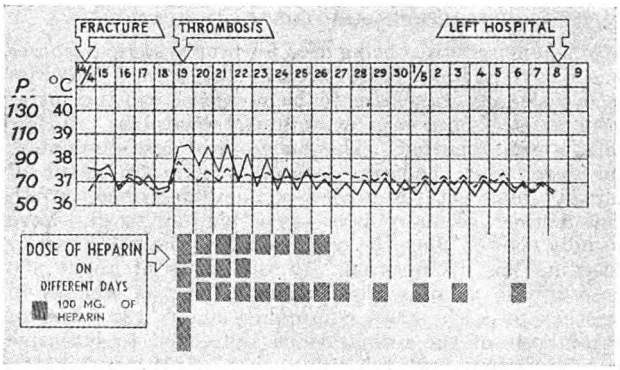

Fig. 7—Example of heparin treatment when the patient must remain in bed at end of heparin cure. Five days after fracture of tibia, a rise in temperature and pulse-rate, and thrombosis in lower part of fractured limb.

Heparin treatment instituted. First day, 150+100+100+150 mg.; then successively reduced doses. On fifth day (April 24) all local symptoms had vanished and temperature was normal. Normally, the patient ought now to have got up, but because of fracture this was impossible. Instead, heparin in gradually diminishing doses was given, both morning and evening during first few days, then only in evenings, then every second evening, and finally every third evening.

Nineteen days after onset of thrombosis all risk of recurrence was held to have passed, and patient was sent home to await normal healing of the fracture.

counteract the mild swelling generally arising in this region in the evening during the first few weeks. The bandage may be an elastic dressing or a length of tricot tubing; at Mariestad we now generally use an Unna's paste stocking. This bandage need be worn only for two or three weeks, by which time most patients can resume their work.

It is of the utmost importance that the patients should get up when, or even before, the heparinisation is terminated. Most of the failures with heparin treatment are due to this rule not being observed. Because of old prejudices, doubt may be felt about the wisdom of allowing a thrombosis patient to move about. But when heparin is no longer being administered the patient is, even on the following day, totally unprotected against the risk of a fresh thrombosing process, and the best way to counteract this risk is to allow him to be up and about.

This rule is naturally inapplicable when the patient's main disease prevents him from getting up—e.g., when fracture of the lower limb makes it impossible to walk. My practice has then been to ensure as good a blood circulation as possible in the limb, by making the patients perform all the tension and relaxation exercises of the muscles that are practicable within a plaster cast, and also by protracted heparin treatment (fig. 7). After the acute signs of thrombosis have subsided, and the ordinary course of heparin therapy terminated, I continue to give doses of 100 mg. each evening for about a week, every second evening for another week, and perhaps twice more at intervals of three days. By this time the body should have adapted itself to the new conditions, and the risk of recurrence of thrombosis is probably no greater than the risk of thrombosis in any other patient confined to bed. This procedure has been adopted in 12 cases, and in none has there been a recurrence. In one it was even possible, 19 days after the temperature returned to normal, to perform an osteosynthesis on the tibia without any sign of thrombosis appearing in the subsequent course.

When thrombosis is first revealed by a massive pulmonary embolism, the treatment may follow the same

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lines. During the first twenty-four hours, however, it is advisable to administer heparin (100–125 mg.) every four hours. The customary 'Eupaverin' treatment should not be neglected.

If a phlegmasia alba dolens is manifest before treatment begins, a slightly longer period of treatment may be necessary (fig. 6).

COMPLICATIONS AND CONTRA-INDICATIONS

When heparin was being used for prophylactic purposes and was given immediately after operations and deliveries it occasionally gave rise to hæmorrhage causing intra-abdominal hæmatomas or wound hæmatomas. A few deaths were reported. This danger is almost eliminated, however, when heparin is used for the treatment of already manifest thrombosis as here described. With this method, so many days—as a rule four to six—have usually elapsed since the operation that the risk of after-bleeding has disappeared. In the series of about 800 cases (table v) presented in this paper, as well as in another Swedish series comprising about 150 cases of thrombosis of the retinal veins submitted to intensive heparinisation, and finally in that of Murray (1941), no serious after-bleeding was ever observed. The only complication of this kind was hæmaturia, which has been occasionally seen but has quickly subsided. I have myself seen 2 cases of slight hæmaturia, which lasted for two days at most and was not followed by other signs of renal irritation; it passed off by itself although heparinisation was continued without reduction in dosage. If, however, for any reason, it should be thought advisable to check the heparin effect, this can be done at once by an intravenous injection of 5–10 c.cm. of a sterile 1% solution of protamine sulphate. A transfusion of whole blood has the same effect, though its action is slower.

Anaphylactic reactions are extremely rare. In the series of more than 1000 thrombosis patients treated in different clinics in Sweden, and among 1100 earlier patients treated prophylactically, only a few such cases occurred.

It may indeed be said that there are hardly any contra-indications to the use of heparin as a treatment for thrombosis. This remedy may be regarded as the body's own coagulation preventive, and diseases of the liver, kidneys, and other parenchymal organs constitute no obstacle to its use. In puerperal women the lochia are not affected in any way. It should be emphasised that caution is necessary when there has been bleeding from some internal organ—e.g., from a hæmorrhagic gastric ulcer. I myself, however, have seen a strongly positive Weber reaction in fæces become negative while heparin was being given.

Summary

The available figures suggest that thrombo-embolic complications occur after about 1·6% of surgical operations, or in every 60th patient. Of these patients every 6th dies of pulmonary embolism. Among women in childbed, about 1·2% (every 80th) develops this complication, and of these not quite every 25th dies. Among patients in medical wards the incidence and mortality are just as high as in the surgical wards generally. In cases of fracture or other trauma of the lower limbs thrombotic complications are particularly common, with an incidence up to 15%.

The incidence and mortality seem to have remained unaltered for several decades. Now, however, a change for the better appears possible through the use of specific anticoagulative remedies.

Heparin can be used as a prophylactic, but is best employed as a remedy for already existing thrombosis. To obtain the best results diagnosis must be made at the earliest possible stage. It now appears to be established that the process almost always begins in the deep veins of the lower leg. Diagnosis at this early stage is facilitated and confirmed by phlebography.

If intensive heparinisation is instituted at this stage, with doses of 300–500 mg. (or 24,000–70,000 international heparin units) a day according to a definite schedule, the disease is generally aborted. After 3–5 days the acute symptoms usually subside, and the pulse and temperature return to normal. As a rule it is then possible to allow patients to get up. They can leave hospital within a few days and soon resume their work.

More advanced thrombosis, accompanied by phlegmasia alba dolens, responds well to the same treatment, but requires more time and larger doses for cure.

Massive pulmonary embolism reacts favourably to heparin. Large doses, administered early, prevent further deposits on the embolus, and generally carry the patient over the first critical 24 hours, after which recovery is almost as quick as in uncomplicated thrombosis.

In a series comprising 622 thrombosis patients treated on this principle in Sweden, there were only 5 deaths. Good results have also been reported from Canada. Thus it now seems possible, with the aid of heparin, to reduce the mortality from thrombosis to under 1%, as compared with the previous figures of about 16–20% for surgical and medical cases and 3–5% for obstetrical cases.

In the past the period by which the stay in hospital has been prolonged by an attack of thrombosis has been about 6 weeks. With heparin treatment it is generally no more than 6–9 days.

Clinical and phlebographic studies have shown that patients surviving thrombosis develop serious after-effects which have received too little attention. They all suffer permanently from swelling of the affected leg, while 9 out of 10 eventually show indurative lesions on the lower leg, and 4 out of 5 leg ulcers. Of ordinary leg ulcers, 80–90% seem to be caused by a deep thrombosis suffered at an earlier period. All these disorders and their social consequences can be avoided if thrombosis is treated with heparin at an early stage.

The risks associated with heparin therapy are slight. When the drug is used for the treatment of manifest thrombosis there is hardly any danger of its inducing hæmorrhage. Experience up to date does not point to any contra-indications.

REFERENCES

Bahls, G. (1940) *Med. Klin.* **36**, 216.
Barker, N., Counsellor, V. S. (1939) *Amer. J. Gynec. Obstet.* **37**, 644.
Bauer, G. (1940) *Acta chir. scand.* **84**, suppl. 61; (1941a) *Ibid*, **107**, 136; (1941b) *Arch. Surg., Chicago*, **43**, 462; (1942) *Acta chir. scand.* **86**, suppl. 74.
Birger, I. (1941) *Nord. Med.* **16**, 1240.
Braun, H. (1939) Ueber Thrombosen und Embolien, Cologne.
Charles, A. F., Scott, D. A. (1933) *J. biol. Chem.* **102**, 425.
Crafoord, C. (1937) *Acta chir. scand.* **74**, 407; (1939) *Ibid*, **82**, 319; (1941) *Acta med. scand.* **107**, 116.
— Jorpes, E. (1941) *J. Amer. med. Ass.* **116**, 2831.
Dahl-Iversen, E., Ramberg, E. (1932) *Hospitalstidende*, **75**, 371.
Fischer, A. W. (1940) *Med. Klin.* **36**, 220.
Giertz, K. H., Crafoord, C. (1928–29) *Acta chir. scand.* **64**, 121.
Haase, W. (1940) *Med. Klin.* **36**, 244.
Hellsten, W. (1942) *Acta chir. scand.* **86**, suppl. 73.
Holzmann, H. (1924) *Schweiz. med. Wschr.* **5**, 569.
Homans, J. (1938) *J. int. Chir.* **3**, 599; (1939) Circulatory Diseases of the Extremities, New York.
Jorpes, E. (1935) *Biochem. J.* **29**, 1817; (1943a) *Svenska Läkartids.* **40**, 234; (1943b) *Acta obstet. gynec. scand.* **23**, 256.
Journal of American Medical Association (1940) editorial, **115**, 2181.
Linde, S. (1941) *Acta chir. scand.* **84**, 310.
Mikuliz-Radecki, F. (1941) Geburtshilfe des praktizierenden Arztes, Königsberg, p. 428.
Morawitz, P. (1934) *Verh. dtsch. Ges. Kreislaufforsch.* **7**, 80.
Murray, D. G. W. (1939) see *Lancet*, ii, 133; (1940) *Arch. Surg., Chicago*, **40**, 307; (1941) *Surg. Gynec. Obstet.* **72**, 340.
Nettelblad, A. (1931) *Acta obstet. gynec. scand.* **11**, 165.
Nicolaysen, J. (1931–32) *Acta chir. scand.* **69**, 21.
Nürnberger, L. (1934) *Verh. dtsch. Ges. Kreislaufforsch.* **7**, 101.
Prandoni, A., Wright, I. (1942) *Bull. N.Y. Acad. Med.* **18**, 443.
Ranzi, E., Huber, P. (1935) *Wien. klin. Wschr.* **48**, 289.
Robertson, H. E. (1938) *Amer. J. Surg.* **41**, 81.
Singer, B. (1929) *Dtsch. Arch. klin. Med.* **164**, 175.
Swedish Society of Surgeons and Society for Internal Medicine symposium (1941) *Acta med. scand.* **107**, 107.
Vance, B. M. (1934) *Amer. J. Surg.* **26**, 19.
Wetterdal, P. (1941) *Acta med. scand.* **107**, 121.
Zilliacus, H. (1946) *Ibid*, suppl., in press.

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EFFECT OF pH OF THE MEDIUM ON ACTIVITY OF STREPTOMYCIN AND PENICILLIN

AND OTHER CHEMOTHERAPEUTIC SUBSTANCES

E. P. ABRAHAM, M.A., D.Phil. Oxfd
E. S. DUTHIE *, M.A. Oxfd, M.B. Dubl.
From the Sir William Dunn School of Pathology, Oxford

WHILE studying the antibacterial properties of proactinomycin (Gardner and Chain 1942) and streptomycin (Waksman et al. 1944) it was noticed that the activity of both these basic substances varied considerably with the hydrogen-ion concentration of the medium in which they were tested. Although normally the bacteria grew well between pH 6·0 and pH 8·0, a given concentration of either basic antibiotic was considerably more effective at the higher than at the lower pH. Acidic antibiotics such as penicillin, mycophenolic acid (Florey et al. 1946), and helvolic acid (Chain et al. 1943) were then found to show the reverse effect, becoming more active as the pH of the medium decreased.

In the case of the two basic antibiotics as much as tenfold differences were encountered between activities measured at pH 6·0 and pH 8·0. Apart from their theoretical interest, differences of this order may limit the therapeutic action of these basic substances, since pus and possibly a number of body tissues (Rous 1925) are at pH 6·0 or less, and they help to explain some anomalies encountered in both animal and human trials. While there are many published references to the variation in antibacterial activity of bases with change in pH, including one to that of streptomycin by Waksman et al. (1944), the corresponding phenomenon has not been adequately described in the case of acidic substances such as penicillin. Although in the case of acidic antibacterial substances the differences in activity appear in general to be less than those encountered with basic substances, they may be sufficient to account for discrepancies such as some of the variations in the end-point readings which have been reported for penicillin.

METHODS

Serial Dilution Tests.—These were carried out in either heart or 'Lemco' broth. Readings were made after 18–48 hours.

Cylinder Plate Tests (Heatley 1944).—Phosphate was incorporated in nutrient lemco agar and the mixture brought to initial pH's of approximately 6·0, 6·5, 7·0, and 7·5. Plates of this agar were seeded with an 18-hour culture of the staphylococcus (H strain) diluted 1/1000 and were dried in the usual manner.

Measurements of Growth and Killing Curves.—Bacterial counts were made on cultures in heart or lemco broth. These cultures were aerated at 37° C, either by rotation in Erlenmeyer flasks or by bubbling through them a slow stream of sterile air (Abraham 1945a). Viable organisms were counted by spreading two drops of a suitably diluted culture on the surface of nutrient agar plates. Total counts were made in a Neubauer hæmocytometer.

Antibiotics.—The penicillin used was Pfizer material with an activity of 500–600 units per mg. The streptomycin was a portion of a batch made available by Messrs. Merck & Co. Inc. for clinical trials in infections of the nervous system. The proactinomycin was provided by Mrs. F. J. Philpot and the helvolic acid and mycophenolic acid by Sir Howard Florey.

TABLE II—EFFECT OF CHANGE IN pH AND SIZE OF INITIAL INOCULUM ON THE ACTIVITY OF STREPTOMYCIN AGAINST DIFFERENT BACTERIA. STREPTOMYCIN LEVELS ARE THOSE REQUIRED TO PREVENT VISIBLE GROWTH DURING 48 HOURS AT 37° C. ALL TESTS CARRIED OUT IN LEMCO BROTH APART FROM THAT OF *Strep. pyogenes* WHICH WAS DONE IN HEART BROTH

Organism	Viable organisms (mills per c.cm.) in original culture = X	Units of streptomycin per c.cm. giving complete inhibition					
		Bacterial density $\frac{X}{100}$			Bacterial density $\frac{X}{100,000}$		
		pH 6·0	pH 7·4	pH 8·0	pH 6·0	pH 7·4	pH 8·0
Strep. pyogenes ..	20	5·0	2·5	1·0	5·0	1·0	1·0
Strep. fæcalis ..	1000	100	25	6·0	25·0	2·0	2·0
Staph. aureus. Oxford H strain	1700	100	25	12·0	12·0	6·0	1·0
B. proteus ..	2000	100	25	25·0	6·0	2·0	2·0
Bact. coli ..	430	150	25	3·0	10·0	2·5	1·0
Bact. typhosum ..	840	200	12	3·0	25·0	6·0	3·0
Ps. pyocyanea ..	1160	250	250	100	6·0	3·0	3·0

EFFECT OF pH ON SERIAL DILUTION TEST READINGS

The effect of pH on the activities of the various substances tested by the serial dilution method is shown in tables I and II.

Penicillin and Mycophenolic Acid.—These acidic substances become more active when the pH is reduced from 7·5 to 6·5 (table I). In the case of penicillin the apparent relative activities at the two pH's vary

TABLE I—SERIAL DILUTION TESTS IN HEART BROTH AT DIFFERENT pH'S. CONCENTRATION OF ANTIBIOTICS PREVENTING VISIBLE GROWTH FROM AN INITIAL INOCULUM OF 15,000 OXFORD H STRAIN STAPHYLOCOCCI PER C.CM.

Substance	Hours after inoculation	pH	Concentration of antibiotics						
			0·08 unit per c.cm.	0·06 unit per c.cm.	0·04 unit per c.cm.	0·03 unit per c.cm.	0·02 unit per c.cm.	0·01 unit per c.cm.	
Penicillin	16	6·5	−	−	−	++	++	+++	
		7·5	−	−	−	++	++	+++	
	24	6·5	−	−	−	+++	+++	+++	
		7·5	−	+++	+++	+++	+++	+++	
	36	6·5	−	++	+	+++	+++	+++	
		7·5	−	+++	+++	+++	+++	+++	
			1 in 5×10^3	1 in 10^4	1 in 2×10^4	1 in 4×10^4	1 in 8×10^4	1 in 16×10^4	
Mycophenolic acid	18	6·63	−	−	−	+	++	+++	
		7·50	−	+−	++	+++	+++	+++	
			1 in 2×10^4	1 in 4×10^4	1 in 8×10^4	1 in 16×10^4	1 in 32×10^4	1 in 64×10^4	1 in 128×10^4
Proactinomycin	18	6·63	−	−	−	++	+++	+++	+++
		7·50	−	−	−	−	−	++	+++
Proflavine	18	6·63	−	+	++	+++	+++	+++	+++
		7·50	−	−	−	++	+++	+++	+++

+++ Full growth. ++ and + Degrees of partial growth. − No growth.

* With a personal grant from the Nuffield Provincial Hospitals Trust.

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markedly with the time at which the test is read, probably owing to the peculiar effect of penicillin on the growth curves (vide infra).

Streptomycin, Proactinomycin, and Proflavine.—These basic substances become less active when the pH is reduced. Streptomycin shows a well-marked decrease in activity against a number of different bacteria as the hydrogen-ion concentration increases (table II). With small inocula of 5000–10,000 organisms per c.cm., such as are commonly used in serial dilution tests, this may amount to a fourfold loss in activity for a fall in pH from 7·2 (at which the drug is commonly estimated) to 6·2 (a fairly usual pH for pus). In addition, streptomycin shows a considerable loss in activity with an increase in the number of organisms in the inoculum (table II). A thousandfold increase in the number of bacteria present may lead to at least a further fourfold loss in activity.' The combined effect of altering the pH from 7·2 to 6·2 and of increasing the number of bacteria from 10,000 to 10 million per c.cm. may thus easily be to decrease the activity, as measured by the dilution test, some sixteen to thirty-two times. Thus, while *Bact. typhosum* in a density of 5000 organisms per c.cm. is inhibited by 6·0 units of streptomycin per c.cm. at pH 7·2, 25 units are required at pH 6·2, and 250 units at pH 6·2 in the case of 5 million organisms per c.cm. Similar variations were found with all the bacteria tested except *Strep. pyogenes*, which showed practically no change in sensitivity to streptomycin with alterations in the size of the inoculum.

TABLE III—EFFECT OF VARYING (1) CONCENTRATION OF PROACTINOMYCIN AND (2) THE PH OF THE MEDIUM ON THE LENGTH OF THE LAG PHASE OF STAPHYLOCOCCUS IN HEART BROTH. INOCULUM 5×10^6 CELLS PER C.CM.

Concentration of proactinomycin	pH	Length of lag (min.)	Concentration of proactinomycin	pH	Length of lag (min.)
(1)			(2)		
1/400,000	7·45	130	1/100,000	6·45	140
1/200,000	7·45	230	1/100,000	6·92	250
1/100,000	7·45	450	1/100,000	7·45	480

The two bases proactinomycin and proflavine show against the staphylococcus a reduction in activity similar to that shown by streptomycin as the pH falls (table I).

Measurements of the growth curves of the staphylococcus in the presence of proactinomycin confirmed the indication of the serial dilution test that a tenfold decrease in hydrogen-ion concentration (one pH unit) was equivalent to a fourfold increase in the concentration of the antibiotic. One of the main effects of proactinomycin in low concentrations is to lengthen the lag phase of the staphylococcus (Abraham 1945b), and it is evident from table III that while at pH 6·43 a concentration of 1 in 100,000 proactinomycin is required to increase the lag to 140 minutes, an equivalent effect is obtained with 1 in 400,000 of the antibiotic at pH 7·45.

This change in the activity of proactinomycin with the pH of the medium may be partly responsible for the divergent results obtained by Florey et al. (1945) when assaying the substance at different times by the serial dilution method.

EFFECT OF PH AS MEASURED BY THE CYLINDER PLATE METHOD

Table IV shows a typical set of figures illustrating the effect of pH on the diameters of the inhibition zones produced by the substances tested. Qualitatively the effect of changing the pH is clear. The bases proactinomycin, streptomycin, and proflavine increase considerably in activity, while mycophenolic acid and helvolic acid decrease in activity, with increasing pH. Penicillin shows no clear-cut change in activity with pH when tested in this way. Fig. 1 shows the inhibition zones produced by proactinomycin, streptomycin, and penicillin at pH 6·0, 7·0, and 7·5.

TABLE IV—COMPARISON OF SIZE OF INHIBITION ZONES ON PLATES WITH DIFFERENT PH VALUES

Substance	Concentration per c.cm.	Nature	Diameter of zone (mm.) with initial pH of:			
			6·0	6·5	7·0	7·5
Proactinomycin ..	0·5 mg.	Base	18	..	28	36
Streptomycin ..	100 units	Base	12	..	19	26
Proflavine	0·5 mg.	Base	19	23	27	33
Mycophenolic acid..	0·25 mg.	Acid	28	24	21	20
Helvolic acid ..	0·05 mg.	Acid	28	26	25	24
Penicillin	1·0 unit	Acid	28	..	25	27

No very accurate estimate of the change in activity with pH can be made from the figures in table IV, but a comparison of these figures with the diameters of the inhibition zones produced by various concentrations of the drugs at pH 7·5 indicated that the increase in the activity of proactinomycin, streptomycin, or proflavine, when the initial pH of the plate is raised from 6·0 to 7·5, is of a tenfold order.

EFFECT OF PH ON THE BACTERICIDAL ACTION OF STREPTOMYCIN, PROACTINOMYCIN, AND PENICILLIN

Streptomycin and Proactinomycin.—The effect of changing the pH of the medium on the bactericidal action of the basic antibiotics, streptomycin and proactinomycin, against the staphylococcus (H strain) is illustrated in fig. 2. When these substances are at the borderline of their bactericidal concentrations the pH is a critical factor in determining the fate of the cells.

Using an inoculum of 3000 bacteria per c.cm., 5 units per c.cm. of streptomycin appeared to exert a progressive killing effect at both pH 7·0 and 8·0, while at pH 6·1 the same amount of drug had no bactericidal effect and the culture was fully grown in about 18 hours. Using an inoculum of 5 million bacteria per c.cm. in the presence of 1 in 30,000 proactinomycin there was a slow increase in the total number of organisms to 39 million and a smaller but definite increase in the number of viable organisms to 9 million, after 23 hours, when the pH was 6·6. Under the same conditions at pH 7·5, however, the total number of organisms increased to 7·8 million while the apparent number of viable organisms fell to 80,000, less than 2% of the number originally present.

TABLE V—COMPARISON OF EFFECT OF TWO CONCENTRATIONS OF PENICILLIN AT DIFFERENT PH'S ON THE STAPHYLOCOCCUS (H STRAIN). CULTURES IN ROTATED FLASKS

Penicillin (units per c.cm.)	Viable staphylococci per c.cm.						
	pH	0 hr.	3 hr.	5 hr.	7 hr.	12 hr.	48 hr.
10	6·2	3·8 mills	84,000	64,000	52,000	21,000	40
10	7·4	3·7 mills	287,000	90,000	85,000	10,000	30
10	8·0	3·7 mills	133,000	194,000	104,000	6,000	100
0·1	6·1	5·0 mills	..	189,000	..	42,000	120
0·1	7·1	5·0 mills	..	144,000	..	21,000	1450
0·1	7·7	5·0 mills	..	132,300	..	168,000	5 mills

Penicillin.—The curves in fig. 3 illustrate the bactericidal action of penicillin at pH's 6·50 and 7·57 using concentrations of penicillin which are close to the minimal effective amounts. They confirm the impression gained from the tube dilution tests that penicillin in minimal

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amounts becomes more active as the pH of the medium falls. In fact, it is at least twice as active at pH 6·50 as at pH 7·57, since the curve given by a concentration of 0·08 unit per c.cm. at pH 7·57 approximates closely to that given by 0·04 unit per c.cm. at pH 6·50.

It is evident from the results of serial dilution tests given above that tube tests read on the basis of opacity after an arbitrary time such as 18 hours do not provide a very reliable measure of penicillin activity. The reason for this lies in the fact that in the presence of low concentrations of penicillin the primary sequence of growth, swelling, and lysis of the staphylococci (cf. Chain and Duthie 1945) may be repeated, a phenomenon which was first reported by Bonét-Maury and Pérault (1945) and is evident in fig. 3 in the curve for 0·08 unit per c.cm. at pH 7·57. Although the height of the first crest of these wave-like curves is directly related to the dilution of the penicillin, this is not the case with the second crest. Fig. 4, for instance, shows that after 22 hours more than twice as many bacteria were visible in the

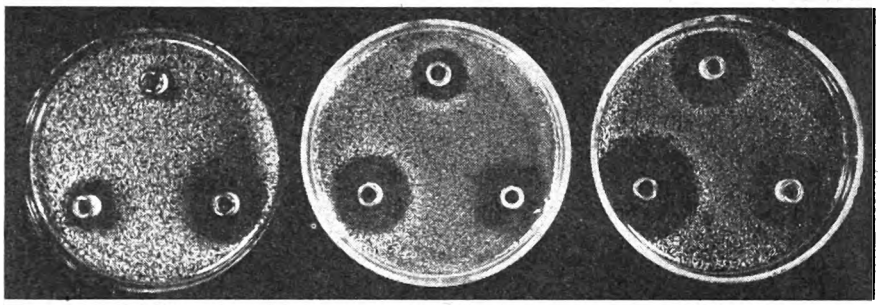

Fig. 1—Inhibition zones produced by streptomycin (top), proactinomycin (left), and penicillin (right) on plates at pH 6·0, 7·0, and 7·5.

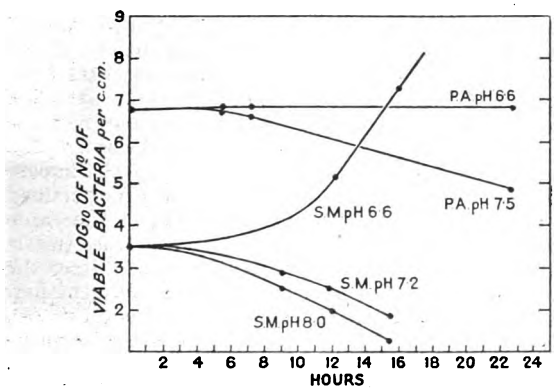

Fig. 2—Effect of the pH of the medium on the activity of streptomycin and proactinomycin against the staphylococcus.
S.M.=Streptomycin (5 units per c.cm.)
P.A.=Proactinomycin (1 in 30,000)

presence of 0·04 unit per c.cm. as in the presence of 0·03 unit per c.cm.

Such fluctuations may well be responsible for the anomalies found near the end-point in the tube dilution tests for penicillin and noted by Bigger (1944). These anomalies are frequent and may consist in the presence of turbidity in a tube containing a given concentration of penicillin, while a tube containing the next higher concentration is perfectly clear. If penicillin activity is to be estimated by a single opacity measurement the most reliable procedure is to begin with a fairly large inoculum of, say, 5 million organisms per c.cm. and to make the measurement after about 4½ hours, when the primary increase in the number of bacteria has reached, or just passed, its maximum. This kind of procedure has been used by Foster and Wilker (1943).

With larger amounts of penicillin (10 units and 0·1 unit per c.cm.) no very striking differences were detected in the rate or amount of killing at the three pH's tested (table v). In contrast to the findings of Garrod (1945), the fall in the number of viable bacteria in the first 6 hours was if anything more rapid on the acid side of the neutral point. This was confirmed by several observations. The primary rate of killing by 0·1 unit of penicillin was not greatly different from that by 10 units, but in the former case there was a striking difference between the cultures at the different pH's after 48 hours. At pH 6·1 there were then only 120 viable organisms per c.cm. while at pH 7·7 the survivors of the primary killing had multiplied to 5 million. The interpretation of these long-term readings, however, is complicated by the possibility that the penicillin may have been partially inactivated.

DISCUSSION

Interpretation of Effect of pH on Antibacterial Activity.—It is certainly a very common, and perhaps so far a universal, finding that strong bases with antibacterial properties show increased activity as the pH of the medium is raised. Publications illustrating this are as follows:

Author	*Antibacterial base*
Browning, Gulbransen, and Kennaway (1919)	Acridine derivatives
Graham-Smith (1919)	Acridine derivatives
Eggerth (1926)	Acridine derivatives
Albert, Rubbo, Goldacre, Davey, and Stone (1941, 1945)	Acridine derivatives
Gershenfeld and Perlstein (1941)	Cationic detergents
Foster and Woodruff (1943b)	Streptothricin
Waksman, Bugie, and Schatz (1944)	Streptomycin
Silverman and Evans (1944)	Mepacrine
Bernheim (1944)	Propamidine
Elson (1945)	Propamidine

In the case of mepacrine ('Atebrin') it was shown that an increase in the pH from 6·2 to 7·6 caused an eightfold increase in the percentage of the drug bound by cells of *Bact. coli*.

Two different hypotheses which might account for this effect are conceivable. First, it might be supposed that the free base, possibly because it is able to penetrate the lipoid material of the cell, is more active than

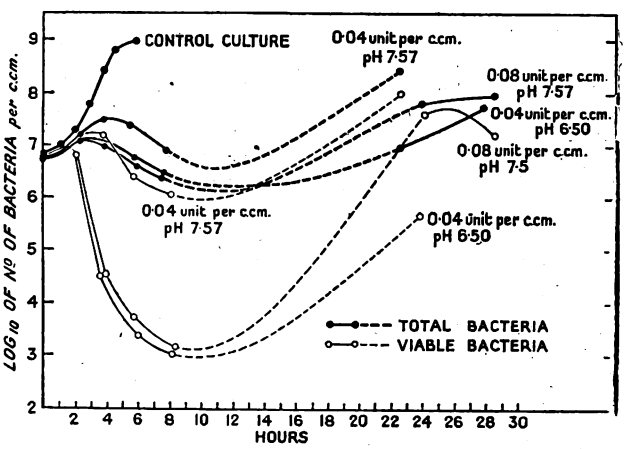
LOG10 OF Nº OF BACTERIA per c.cm.
HOURS
CONTROL CULTURE
0·04 unit per c.cm. pH 7·57
0·08 unit per c.cm. pH 7·57
0·04 unit per c.cm. pH 6·50
0·08 unit per c.cm. pH 7·5
0·04 unit per c.cm. pH 7·57
0·04 unit per c.cm. pH 6·50
TOTAL BACTERIA
VIABLE BACTERIA

Fig. 3—Effect of the pH of the medium on the activity of low concentrations of penicillin against the staphylococcus. Cultures grown in heart broth aerated by a stream of air.

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its cation. Bases such as streptomycin, proactinomycin, and proflavine, which have pK values of approximately 9·0, are largely in the cationic form between pH 6 and 8, so in this range the concentration of free base in solution increases nearly tenfold with a rise in pH of 1 unit. This point of view has been taken by Bernheim (1944) and by Waksman, Bugie, and Schatz (1944). Secondly, it might be assumed that the cation is mainly responsible for the activity of the base. Since in the case of strong bases the cation concentration will not change greatly between pH 6 and 8 the effect of changes in the hydrogen-ion concentration must then be supposed to be on the bacterial cell. In its simplest form this hypothesis involves a competition of base cations and hydrogen ions for centres on the cell surface. Elson (1945) and Albert et al. (1945) adhere to this view.

Although more exact data on this phenomenon would be desirable, and although the reasons for it may be different in the case of different bases, there is at least presumptive evidence that a change in the cell surface with the hydrogen-ion concentration, which alters the

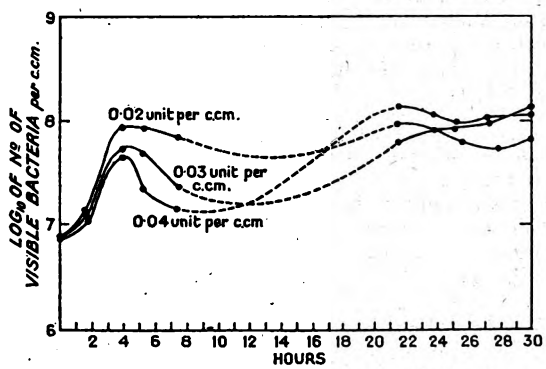
9
8
7
6
LOG$_{10}$ OF Nº OF VISIBLE BACTERIA per c.cm.
0·02 unit per c.cm.
0·03 unit per c.cm.
0·04 unit per c.cm
2 4 6 8 10 12 14 16 18 20 22 24 26 28 30
HOURS

Fig. 4—Effect of low concentrations of penicillin at pH 7·5 on the number of visible staphylococci.

accessibility to the surface of the cation of the base, is the most important factor involved. Albert, Rubbo, and Goldacre (1941) and Albert et al. (1945) measured the dissociation constants of a series of acridine derivatives and found that the most active compounds at pH 7 were the most strongly basic and the most hydrophilic. It would thus be unreasonable to suppose that the increase in activity of a given acridine with a rise in pH is due to an increase in the concentration of free base. The cationic detergents are quarternary ammonium salts, the cations of which cannot exist as such in an un-ionised form, so that in this case also the pH effect can hardly be attributed to an increase in the amount of un-ionised base.

On the other hand it might be expected that the first attachment of a base to the cell surface would be through the positively charged nitrogen of its cation. Schulman and Rideal (1937) showed that the primary act in the penetration of lipoid or protein surface films by various drugs is the anchoring of the drug by a polar group to a polar group of the film-forming material. There is also evidence to show that the cations of antibacterial bases may compete with other ions for positions on the cell surface. Valko and DuBois (1944) found that the activity of a highly toxic cationic detergent was lowered in the presence of a relatively innocuous one. Similar phenomena have been reported by other workers (Silverman and Evans 1944, Snell 1944). Stearn and Stearn (1930) found that basic dyes could displace hydrogen ions from proteins, and Kuhn and Bielig (1940) found that the effect of cationic detergents on simple and conjugated proteins was dependent on the pH of the protein solution and on its iso-electric point. All these observations are in harmony with the assumption that the effect of changes in pH on the activity of antibacterial bases is due, at least in part, to a competition between the cations of the base and hydrogen ions for positions on the surface of the bacterial cell.

The published work dealing with the effect of the hydrogen-ion concentration on the activity of acidic antibacterial substances is relatively sparse. Scales and Kemp (1941) reported that there is an increase in activity of the anionic detergents as the pH of the medium is lowered. Publications relating to penicillin are contradictory. Foster and Woodruff (1943a) and Foster and Wilker (1943) maintained that penicillin was three times as active at pH 5·5 as at pH 7·0 when assayed by a plate method, but that the activity did not vary with the pH when the assay was made turbidimetrically. On the other hand Garrod (1945) stated that the action of penicillin was progressively impaired by an increase in the acidity of the medium between pH 7·0 and 5·0. The results reported here show clearly that the activity of a suboptimal amount of penicillin is increased at least twofold by an increase in the acidity of the medium corresponding to one pH unit in the region of the neutral point. The evidence available indicates that in general the activity of an acidic antibacterial substance increases with a rise in the hydrogen-ion concentration of the medium. Competition between the acid anions and hydroxyl ions is probably an important factor involved.

If there were a simple competition between the cations of an antibacterial strong base and hydrogen ions for centres of negative charge on the cell surface the relative numbers of such centres occupied by the two kinds of ion should be dependent only on the relative concentrations of the ions and be independent of their absolute concentrations. Hence, if the base cation could only become attached to the cell by displacing a hydrogen ion, then an increase in the pH of the medium of 1 unit over the range 6–8 should have almost the same effect as a tenfold increase in the concentration of the base when the pH remained constant. With an antibacterial strong acid the same increase in activity should result from a decrease in the pH of 1 unit. The data available indicate that the actual effects of changes in pH are considerably smaller. This is not surprising, however, since there is no reason to expect that under the conditions used the adsorptive centres would be nearly saturated by the ions involved. In addition the active ions might also gain access to the cells by ways in which the possibility of competition with hydrogen or hydroxyl ions is excluded.

The variations in activity with hydrogen-ion concentration which are shown by some antibacterial substances may not be explicable in the manner that has been considered. In the case of weak acids and bases the change in concentrations of the ionised forms which may occur with variations in pH around the neutral point is naturally a complicating factor and may become a controlling one. The pronounced *increase* in activity of the weak acid sulphanilamide on raising the pH (Rose and Fox 1942) would appear to require the assumption that the formation of increasing amounts of anion is here the determining factor. Bell and Roblin (1942) however found that when the activities of a series of sulphonamides were plotted against their acid strengths the activity curve rose to a maximum and subsequently fell, so the activity of a given compound in this series is not dependent simply on the proportion of it present in the anionic form at the pH of testing.

Clinical Implications.—The decreased activity of basic drugs against bacteria in acid media may constitute a serious handicap to their successful clinical use and is possibly responsible for the otherwise puzzling observations of Reimann, Elias, and Price (1945), who noted that in typhoid infections bacilli might continue to circulate in the blood-stream although streptomycin was present there in amounts sufficient to kill them. A similar phenomenon was noted by one of us (E. S. D.)

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in examining the cerebrospinal fluid from cases of meningitis due to *Ps. pyocyanea* which were being treated with streptomycin administered intrathecally. The bacteria did not show any increased resistance in either case, and it is likely that the streptomycin level was inadequate at the more acid reactions prevailing in the damaged tissues, from which the bacteria could easily enter the blood-stream or cerebrospinal fluid. Other basic chemotherapeutic agents, such as basic arsenical compounds or alkaloids, may suffer from the same disadvantage, and this may help to account for their comparative failure in the more chronic forms of infection as contrasted with their success in the more acute types. The alkaloid emetine has been shown to have greater activity against *Entamœba histolytica* in alkaline than in acid media (St. John 1933), which may be partly responsible for its greater success when coincident bacterial infection is reduced or eliminated by sulphonamides and penicillin (Hargreaves 1945). Acid drugs, such as penicillin and helvolic acid, do not suffer from these disadvantages; on the contrary their action is enhanced by any increase in the acidity of the tissues. In combating infections in which tissue damage is a prominent feature, acid compounds are likely to prove of more value, ceteris paribus, than basic compounds.

SUMMARY

An increase in the acidity of the medium decreases the antibacterial activity of the basic substances streptomycin and proactinomycin; on the other hand it increases that of the acidic substances penicillin, mycophenolic acid, and helvolic acid.

The most likely explanation is that the ionised forms of the basic drugs compete with hydrogen ions, and those of the acid drugs with hydroxyl ions, for position on the cell surface.

Since tissue damage is accompanied by an increase in local acidity, a concentration of a basic drug which is effective in the blood may be inadequate to destroy bacteria in local lesions.

We are indebted to Pte. P. Bowdery, Miss Ruth Callow, and Miss Eileen Page for technical assistance.

REFERENCES

Abraham, E. P. (1945a) *Biochem. J.* in press; (1945b) *Brit. J. exp. Path.* **26**, 349.
Albert, A., Rubbo, S. D., Goldacre, R. J. (1941) *Nature, Lond.* **147**, 332.
— — — Davey, M. E., Stone, J. D. (1945) *Brit. J. exp. Path.* **26**, 160.
Bell, P. H., Roblin, R. O. (1942) *J. Amer. chem. Soc.* **64**, 2905.
Bernheim, F. (1944) *J. Pharmacol.* **80**, 199.
Bigger, J. W. (1944) *Lancet*, ii, 400.
Bonét-Maury, P., Pérault, R. (1945) *Nature, Lond.* **155**, 701.
Browning, C. H., Gulbransen, R., Kennaway, E. L. (1919) *J. Path. Bact.* **23**, 106.
Chain, E., Florey, H. W., Jennings, M. A., Williams, T. I. (1943) *Brit. J. exp. Path.* **24**, 108.
— Duthie, E. S. (1945) *Lancet*, i, 652.
Eggerth, A. H. (1926) *J. infect. Dis.* **38**, 440.
Elson, W. O. (1945) *Ibid*, **76**, 193.
Florey, H. W., Gilliver, K., Jennings, M. A., Sanders, A. G. (1946) *Lancet*, Jan. 12, p. 46.
— Jennings, M. A., Sanders, A. G. (1945) *Brit. J. exp. Path.* **26**, 337.
Foster, J. W., Woodruff, H. B. (1943a) *J. Bact.* **46**, 187; (1943b) *Arch. Biochem.* **3**, 241.
— Wilker, B. L. (1943) *J. Bact.* **46**, 377.
Gardner, A. D., Chain, E. (1942) *Brit. J. exp. Path.* **23**, 123.
Garrod, L. P. (1945) *Brit. med. J.* i, 107.
Gershenfeld, L., Perlstein, D. (1941) *Amer. J. Pharmacol.* **113**, 237.
Graham-Smith, G. S. (1919) *J. Hyg., Camb.* **18**, 1.
Hargreaves, W. H. (1945) *Lancet*, ii, 68.
Heatley, N. G. (1944) *Biochem. J.* **38**, 61.
Kuhn, R., Bielig, H. J. (1940) *Ber. dtsch. chem. Ges.* **73**, 1080.
Reimann, H. A., Elias, W. F., Price, A. H. (1945) *J. Amer. med. Ass.* **128**, 175.
Rose, H. M., Fox, C. L. (1942) *Science*, **95**, 412.
Rous, P. (1925) *J. exp. Med.* **41**, 739.
St. John, J. H. (1933) *Amer. J. Hyg.* **18**, 414.
Scales, F. M., Kemp, M. (1941) *Assoc. Bull. International Association of Milk Dealers*, **33**, 491.
Schulman, J. H., Rideal, E. K. (1937) *Proc. roy. Soc.* B, **122**, 29.
Silverman, M., Evans, E. A. (1944) *J. biol. Chem.* **154**, 521.
Snell, E. E. (1944) *Ibid*, **152**, 475.
Stearn, A. E., Stearn, E. W. (1930) *J. exp. Med.* **51**, 341.
Valko, E. I., DuBois, A. S. (1944) *J. Bact.* **47**, 15.
Waksman, S. A., Bugie, E., Schatz, A. (1944) *Proc. Mayo Clin.* **19**, 537.

GAS-GANGRENE
FOLLOWING INJECTION OF ADRENALINE

EVA V. COOPER
M.B. Lpool
From the Department of Bacteriology, Liverpool University

IN other countries, especially France, there have been many reported cases of gas-gangrene following the injection of various therapeutic substances, of which the commonest seems to be adrenaline. No cases following injections of adrenaline appear to have been recorded in this country, so it seemed worth while to record a case recently encountered in a young healthy man, together with the results of animal experiments on the effect of adrenaline on the pathogenesis of gas-gangrene.

CASE-REPORT

A man, aged 25, received a hypodermic injection of 2 minims of adrenaline in the left upper arm at about 3 P.M. for a mild urticarial rash attributed to food idiosyncrasy. Four hours later he noticed some pain in the arm on movement. This increased greatly during the night and was accompanied by severe bilateral sciatic pain lasting a few hours, nausea, and general malaise.

Next day he was admitted to the ward with toxæmia and "cellulitis" of the left arm. A diffuse indurated area, 6 × 3 in., was found on the anterolateral aspect of the left upper arm, with limitation of movement of the elbow-joint and axillary adenitis. There was severe toxæmia, with a temperature of 101° F and pulse-rate of 120 per min. Kaolin poultice was applied locally, and a course of sulphathiazole started.

Fluctuation was present after 48 hours, and two incisions were then made under gas-and-oxygen anæsthesia. The fascia was under tension, some blood-clot was present, and gas and a little purulent material escaped. Penicillin treatment was begun, 100,000 units being given immediately, followed by 100,000 units daily by continuous intramuscular drip; polyvalent gas-gangrene antitoxin (*Clostridium welchii* antitoxin 27,000 units, *Cl. œdematiens* 27,000 units, and *Cl. septicum* 13,500 units) was also given. Next day there was much improvement, the pulse-rate falling below 100 per min. for the first time. A second dose of antitoxin was given. On the sixth day gas was demonstrated by radiography, a further operation was done to lay open the affected area, and a piece of necrotic tissue was sent for culture and histological examination. Penicillin was discontinued on the eighth day, when the wound was clean and granulating.

Recovery was uneventful, though full extension of the elbow-joint was not recovered until two months later.

Laboratory Examination.—The primary litmus-milk culture from a swab taken at the first operation was received from the hospital laboratory. It was a pure culture of *Cl. welchii*, giving the usual biochemical reactions. Toxin production was demonstrated by the use of a Nagler plate on one-half of which *Cl. welchii* antitoxin had been spread. The inoculation of 0·25 c.cm. of the fluid from a 24-hour cooked-meat culture killed a mouse in less than 24 hours.

The tissue removed at the second operation yielded a culture of *Cl. welchii* and a gram-positive coagulase-negative coccus with the cultural appearances of a white staphylococcus. This organism was not further studied, since it was regarded as a secondary invader of minor importance; its absence from the first swab appears to exclude its participation in the pathogenesis of the lesion.

Histological examination of the tissue showed scattered muscle-fibres separated by fibrin network and in places collections of red blood cells. In some areas there was no fibrin and the muscle-fibres were fragmented and separated by clear spaces devoid of inflammatory cells, but showing many large gram-positive bacilli. In these areas the fibrillary structure of the muscle-fibres was retained, and cross striation was not entirely lost, but the sarcolemma nuclei had disappeared. The appearances suggest early clostridial myositis or myonecrosis (Robb-Smith 1945) in an area of muscle which had been the site of previous hæmorrhage.

The *adrenaline* left in the bottle from which adrenaline had been withdrawn for injection was examined by cultural methods in the hospital laboratory, but no micro-organisms were grown from it. Since the injection fluid was apparently

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sterile, it was thought that the clostridia must have been present in the needle or syringe or on the skin of the patient, which had been cleaned with ether. By the time the case had come to our notice these possibilities could not be further followed up.

The *needle and syringe* had been kept in spirit, and, since *Cl. welchii* have been isolated from needles kept in 96% alcohol (Anschütz 1927), the syringe or needle seemed a likely source of infection.

TABLE I—EFFECT OF INJECTING 1/8000 ADRENALINE WITH WASHED *Cl. welchii*

Dose of bacilli	Guineapigs dying of gas-gangrene	
	Test series (bacilli + adrenaline)	Control series (bacilli + broth-saline)
40,000,000 ..	3/3	2/3*
4,000,000 ..	3/3	0/3
400,000 ..	3/3	0/3
40,000 ..	3/3	0/3
4000 ..	2/3	0/3
0 ..	0/3	..

* 2/3 = of three guineapigs injected, two died.

EXPERIMENTAL OBSERVATIONS

The minimal infecting dose of washed toxin-free *Cl. welchii* is very large in the absence of an activator such as calcium chloride, a foreign body, or other virulent bacteria which will damage tissue and lower the oxygen tension sufficiently to allow the bacilli to multiply. In this case there was no reason to suspect gross tissue damage, so it was thought that the adrenaline probably played an important part in the pathogenesis of the lesion. To test this hypothesis the strain of *Cl. welchii* isolated from the patient was used in a series of experiments on guineapigs.

The average minimal lethal intramuscular dose for the guineapig of washed bacilli suspended in 1 c.cm. of 10% broth-saline was found to be approximately 12,000,000.

Exp. Series 1.—Two series of guineapigs, weighing 250–300 g. each, were injected intramuscularly with 0·5 c.cm. of tenfold dilutions of a suspension of washed organisms. The volume for injection was made up to 1 c.cm. with 0·5 c.cm. of adrenaline in the test series, and with 0·5 c.cm. of 10% broth-saline in the control series.

Several experiments of this sort were made; in some of these the adrenaline was used in a concentration of 1/1000, in others in a concentration of 1/8000. Control animals in each experiment received adrenaline but no bacilli. Deaths were recorded as due to gas-gangrene

TABLE II—EFFECT OF VARIOUS DILUTIONS OF ADRENALINE INJECTED WITH NON-LETHAL DOSE OF WASHED *Cl. welchii*

Dose of bacilli	Dilution of adrenaline	Guineapigs dying of gas-gangrene
400,000 ..	1/2000	3/3
400,000 ..	1/8000	3/3
400,000 ..	1/32,000	3/3
400,000 ..	1/128,000	2/3
400,000 ..	None	0/3

only when a typical local lesion was found at autopsy, and a smear from the exudate contained numerous gram-positive bacilli morphologically resembling *Cl. welchii*. The results of one typical experiment are given in table I, which shows that the addition of 0·5 c.cm. of 1/8000 adrenaline to a suspension of washed bacilli reduces the lethal dose for the guineapig to 1/10,000 of the dose without adrenaline. These results confirm and extend those of Renaud and Miget (1930) and Brocard (1940).

Exp. Series 2.—To determine the smallest amount of adrenaline which could produce this effect, fifteen guineapigs were each given intramuscularly a dose of 400,000 washed bacilli mixed with 0·5 c.cm. of increasing dilutions of adrenaline, three guineapigs being used for each dilution. The results of this experiment are shown in table II. This shows that adrenaline is still active in a dilution of 1/128,000, which is much higher than the dilution used therapeutically. Since the adrenaline was used for the local, not the general, effect, the small size of the guineapig was not taken into account in determining the dose of adrenaline. The highest dose of adrenaline used had no obvious local or general action on control animals.

Exp. Series 3.—In several reports of cases of gas-gangrene following the injection of adrenaline (Pallasse 1936, Ramond 1943, Lagrot 1938, Touraine and Gautier 1936) it has been suggested that the site of injection is not the site of entry of bacilli into the tissues. These writers consider the possibility of a transient symptomless *Cl. welchii* bacteræmia (the bacilli entering the blood-stream from the alimentary canal), which, when the tissue resistance is lowered locally by the ischæmic effect of adrenaline, gives rise to a focus of gas-gangrene. Brocard describes an experiment in which guineapigs were given 1 c.cm. of 1/10,000 adrenaline intramuscularly,

TABLE III—EFFECT OF ADRENALINE INJECTED INTO LEFT THIGH AND OF WASHED *Cl. welchii* INJECTED INTRAVENOUSLY

Dose of bacilli injected intravenously	No. of guinea-pigs	Test series (adrenaline 1/8000 injected locally)	No. of guinea-pigs	Control series (broth-saline injected locally)
3250	1	Alive and well	1	Alive and well
30,000	2	One alive and well, one died on 2nd day with gas-gangrene of left thigh	2	Both alive and well
300,000	1	Died 2nd day with gas-gangrene of left thigh	1	Alive and well
1,300,000	2	One died 1st day with gas-gangrene of left thigh, one developed lesion in left thigh but survived	2	Both alive and well
3,000,000	1	Died on 2nd day with gas-gangrene of left thigh	1	Alive and well

followed immediately and after various intervals by the intracardiac injection of 0·5 c.cm. of a 1/10 dilution of broth-culture of *Cl. welchii*. Since in no case did a fatal gas-gangrene develop at the site of injection of adrenaline, he concluded that the local injection of bacilli was the more important factor.

In our experiment guineapigs were injected intravenously, either in the ear vein or in the vein of the right foot, with various doses of washed bacilli in a volume of 0·5 c.cm. This was followed immediately by the injection into the muscles of the left thigh of 0·5 c.cm. of 1/8000 adrenaline in the test group, and 0·5 c.cm. of broth-saline in the control guineapigs. The results of this experiment are given in table III.

COMMENT

The results of the last experiment appear to support the view that, in cases of gas-gangrene following injection of adrenaline in man, *Cl. welchii* from the blood-stream become localised in the injected tissues. Nevertheless, in human cases it appears more likely that the infection is introduced at the site of injection. There is no proof that the frequent presence of *Cl. welchii* in the intestine leads to a bacteræmia in an apparently healthy person, and, even if this does happen, it is unlikely that the bacilli would be present in the blood in numbers approaching those used in this experiment. The sources of

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exogenous infection, on the other hand, are numerous, and experiments 1 and 2 show that the injection of adrenaline increases the susceptibility of the tissues at the site of injection to infection with *Cl. welchii* introduced with it. It seems likely that the adrenaline, by its local vasoconstrictor effect, reduces the oxygen tension of the tissues at the site of injection sufficiently to allow of multiplication of the bacilli. Once sufficient growth had taken place, the toxin produced would maintain suitable conditions for growth after the vasoconstrictor effect had ceased.

The clinical course of the case described is very similar to those reported in France in the rapidity of onset of local pain, followed by signs of inflammation and intense toxæmia, but differs from most previous cases in the recovery of the patient. The treatment of this case also differs from that of the earlier cases, as penicillin and sulphathiazole were used, in addition to surgical intervention and antitoxin.

Lagrot (1938) has suggested that, seeing that several cases have followed the injection of adrenaline for asthma, the incidence of gas-gangrene in these cases may be due to an increased sensitivity of the tissues of allergic persons to the vasoconstrictor effect of adrenaline. While it is thought that the relative frequency of development of gas-gangrene in asthmatics (as opposed to non-allergic subjects) is no more than can be explained by the frequency with which adrenaline is used in asthmatic attacks, it may be noted that in our case also there was some evidence of allergy, in that the injection was given in the first place for a mild attack of urticaria.

SUMMARY

A case of gas-gangrene developing at the site of injection of adrenaline is described.

Experiments in guineapigs showed that the intramuscular injection of adrenaline greatly reduced the lethal dose of washed *Cl. welchii* injected with it.

The local injection of adrenaline may determine the production of a focus of gas-gangrene in animals given washed *Cl. welchii* by the intravenous route.

In gas-gangrene following injections of adrenaline in man the source of infection is more likely to be exogenous than endogenous.

I am indebted to Dr. P. Murphy and Dr. M. L. Levy for clinical details of the case, and Dr. R. Y. Dawbarn for the culture isolated at the first operation.

REFERENCES

Anschütz, W. (1927) *Beitr. klin. Chir.* **139**, 129.
Brocard, H. (1940) *C.R. Soc. Biol. Paris*, **134**, 567.
Lagrot, F. (1938) *Pr. méd.* **46**, 1657.
Pallasse, E. (1936) *Lyon méd.* **158**, 249.
Ramond, L. (1943) *Bull. Soc. méd. Hôp. Paris*, **58**, 421.
Renaud, M., Miget, A. (1930) *C.R. Soc. Biol. Paris*, **103**, 1052.
Robb-Smith, A. H. T. (1945) *Lancet*, ii, 362.
Touraine, A., Gautier, J. (1936) *Bull. Soc. franç. Derm. Syph.* **43**, 778.

BACT. COLI MENINGITIS
TREATED WITH SULPHATHIAZOLE

F. E. CRAWLEY
M.D. Glasg., D.P.H.
DEPUTY MEDICAL OFFICER OF HEALTH, SOUTHPORT

Bact. coli is a rare cause of meningitis, and in an extensive survey of the literature Barrett et al. (1942) found records of 106 patients, of whom only 23 recovered, several with residual defects. Records were given of only 6 patients since 1935, and these had been treated with sulphonamides, with only 1 death. Kohlbry (1942) recorded a cure with sulphonamides, Pearlman and Bell (1944) a failure with sulphonamides, and Stallworthy (1943) 2 fatalities, apparently without sulphonamide treatment.

The following case-record again shows the value of sulphonamide treatment.

A woman, aged 34, had had intermittent severe occipital headaches and some pain at times in the left side of her neck for 5–6 months before she was admitted to a nursing-home for induction of labour due to the development of an acute hydramnios, which led to a stillbirth on April 24, 1945.

On the 27th her temperature rose to 101° F, was normal all next day, but rose to 102° F in the evening of the 29th, when she was admitted to the isolation hospital with severe headache, pain in the left side of neck, and pain over the left lower ribs anteriorly. For two days she had noticed occasional diplopia, and on admission she was stuporose, slightly resistive, and at times irrational. Her pupils were pin-point, and no sedative had been given. Apart from this there was no other evidence of involvement of her nervous system. She had a small sutured clean perineal tear. On examination of the chest there was very slight impairment of percussion note at the left base, with diminished breath sounds. Lumbar puncture produced slightly opalescent fluid not under obvious pressure, and radiography of the chest showed a slight clouding in the left costophrenic angle. Blood-pressure was 120/70.

She was given sulphathiazole 1·5 g. four-hourly for twenty-four hours, then 1·0 g. four-hourly, and her temperature gradually became normal on May 2, when she developed a sensitisation erythema nodosum without any subsequent rise of temperature; and, in view of the reports on the cerebrospinal fluid (C.S.F.), the sulphathiazole was continued until the evening of May 5.

The laboratory report on the C.S.F. next day was surprising. A small clot had formed; the cells were 80% polymorphs and 20% lymphocytes, and the albumin 0·24%; culture showed coliform organisms, later identified as *Bact. coli communis*. A catheter sample of urine was sterile and showed no abnormality next day. Blood-count showed 4,200,000 red cells, Hb 85%, colour-index 1·0, white cells 8200 (polymorphs 93%, lymphocytes 7%). Blood Wassermann reaction negative.

Lumbar puncture was repeated on May 2, the fluid being apparently under normal pressure and having a mere suggestion of opalescence. On examination at the laboratory there was a fibrinous clot, very few cells, albumin 0·2%, and *Bact. coli communis* still present. The Wassermann reaction of the C.S.F. was negative.

From May 2 her condition improved steadily. Radiography of her chest still showed a small effusion, and aspiration produced 25 c.cm. of slightly turbid light brown fluid, which was reported as containing a small fibrinous clot and few polymorphs but was sterile on culture.

On May 14 a small tender swelling developed on the right thigh where the injections of pituitary extract had been given in the nursing-home. Two days later aspiration produced 7 c.cm. of thick pus containing *Bact. coli communis*. A further aspiration two weeks later produced another 3 c.cm. of pus, sterile on culture; and no further trouble resulted here. On May 18 radiography of her chest showed nothing abnormal.

Headaches persisted at intervals without obvious cause, apart from the findings of an abnormal C.S.F. On May 23 it still showed a suggestion of opalescence but no clot, cells 180/c.mm., polymorphs 60%, lymphocytes 40%, sugar 0·03%, chlorides 0·75%, albumin 0·1%, slightly increased globulin, and sterile on culture. On June 9 the cells were 80/c.mm., protein 0·065%, sterile.

On June 20 she was seen in consultation by Dr. E. T. Baker-Bates, who could find no clinical evidence of abnormality. On lumbar puncture the pressure was 120 mm., rising normally on Queckenstedt test. Cells 40/c.mm., all lymphocytes, otherwise normal. She was then transferred to Liverpool Southern Hospital under the care of Dr. Baker-Bates. All investigations found nothing abnormal, and she was discharged a week later feeling well but for occasional headaches, which were becoming less troublesome.

There was no doubt about the presence of *Bact. coli communis* in the C.S.F., though the low cell-count was unusual, and it is probable that the pleural effusion would have shown the presence of these organisms if it had been tested before sulphonamides were given. There was no evidence that the effusion was due to embolism. The abscess of thigh also contained these organisms, and it is possible that she had a *Bact. coli* septicæmia or bacteræmia. Though no cause could be found for the

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Medical Societies

TUBERCULOSIS ASSOCIATION

AT a meeting of the association in London on Jan. 18, with Dr. NORMAN TATTERSALL, the president, in the chair, a paper on

Pneumoconiosis in South Wales Coalmines

was read by Dr. JETHRO GOUGH, who said that lung changes due to dust inhalation occurred extensively in South Wales coalworkers. Though they were found most often in anthracite miners, in the last few years there had been many cases in miners of steam-coal and, to a lesser extent, bitumen coal, the pathological changes being similar in all these classes. The two main changes were massive fibrosis and scattered focal lesions. The former were seen especially in the upper halves of lungs, in similar sites to those affected by tuberculosis, which might indeed be demonstrable. The fibrosis might well be due to the combined action of dust and infection, the latter having subsided. Hypertrophy of the right heart was common with massive fibrosis, and death might occur from congestive failure; pulmonary thrombosis had caused death in several recent cases.

Though massive lesions were more important as a cause of death through heart failure or infection, focal lesions were more common. These focal changes might be associated with fibrosis, but more commonly they were found alone; they were almost always present in some degree in middle-aged and elderly South Wales miners whatever the cause of death. One distinctive focal lesion consisted of collections of coaldust surrounded by focal emphysema; the nature of this emphysema was disputed; to determine its place in the sequence, Dr. Gough had examined lungs of miners of all ages by a special technique, with postmortem inflation and mounting on glass. This showed that inhaled coaldust tended to collect into foci, around which developed a characteristic focal emphysema which was an integral part of the lesion and could cause great disorganisation even with slight fibrosis.

Dr. ENID ROGERS, speaking on the relation of tuberculosis to pneumoconiosis, recalled the types of pneumoconiosis which she had seen on the Rand: simple silicosis which begins and ends as a pure dust disease and which frequently remains at the stage of nodulation for many years; and infective silicosis in which the nodular stage rapidly progresses to massive fibrosis. The latter could often be recognised by the earliest nodules, which had a looser, more cellular structure, possibly with points of caseation. When tuberculosis was associated with silicosis, both diseases were modified, the tubercle being chronic and perhaps never revealing itself clinically, though it might break bounds and cause death from acute tuberculous bronchopneumonia.

Of 831 lung specimens from South Wales miners, 35% showed naked-eye tuberculous lesions. Most of these were seen in lungs with massive anthracosilicosis, though 28·5% of the nodular type were accompanied by tubercle. These figures did not fully represent the incidence, since the data of histological lesions were incomplete. Tubercle had been proved in at least 75·8% of the cases of massive fibrosis observed by this group of workers in Cardiff. Infected early nodules were not often seen where nodulation was the only lesion and there was not frank tubercle elsewhere in the lung.

Tuberculosis was often difficult to recognise in miners with pneumoconiosis; it was not excluded by a persistently negative sputum, and constitutional disturbance might be absent; tubercle should be suspected in all cases of pneumoconiosis with massive lesions, though these cases might become very chronic and perhaps be arrested. The practice of the Cardiff panel of the Silicosis Medical Board was not to certify the combined lesions unless the sputum test was positive, which was rarely the case. Dr. Rogers strongly advocated periodical X-ray examination of miners. With the exception of emphysema, which appeared to be the end-result of a simple coaldust pneumoconiosis, the most important factor in fatal dust disease in coalminers was tubercle.

The PRESIDENT emphasised the practical importance of the problem of pneumoconiosis.

Prof. LYLE CUMMINS said that among miners it was usually men of 50–70 who died from sudden extension of tuberculosis in the lungs. Possibly the tuberculous process had previously been suppressed by the anti-infective action of coaldust; but the occasional cases of tuberculosis in younger men had to be taken into account. It had been found that tuberculosis occurred either soon or very long after starting a mining career. The actual silicotic nodule was a finished impenetrable product, unlike the anthracosilicotic nodule. He thought that there might be first a very slight silicosis, behind which anthracosis developed, perhaps to be followed later by infection.

Dr. S. W. FISHER said that anthracosilicosis was draining South Wales of workers, but was not prevalent in other parts of the country. All the affected miners had worked on the coalface. Problems were the legal definition of "disability" and the importance of "reticulation"; the latter did occur in men not doing "hard-headed" work and not exposed to large dust concentrations. Every entrant to South Wales coalmines was now being X-rayed.

Dr. P. D'ARCY HART pointed out that men with reticulation only and without disability were never withdrawn from the mines; but according to Gough there was nevertheless underlying disease. Dr. E. ASLETT said that many early infected cases had negative sputum and no clinical signs. Dr. S. ROODHOUSE GLOYNE, in answer to a question, said that graphite commonly contained silica as an impurity. It was very difficult to obtain either a non-siliceous or a pure silica dust. He was impressed with tuberculosis as a factor.

In reply, Dr. GOUGH said that the real incidence of deaths from silicosis in South Wales was unknown, because the condition was not always certified at death. Dr. ROGERS said that the shortest exposure period that she had known to cause disease was just under five years. She thought the coal-trimmer was a good medium for testing absorption of pure coaldust. The lymphocyte-monocyte ratio helped to detect the onset or presence of infection.

Dr. TATTERSALL gave a presidential address on the Tuberculosis Service and the Future. This will be published in a forthcoming issue.

NORTH OF ENGLAND OBSTETRICAL AND GYNÆCOLOGICAL SOCIETY

AT a meeting of the society in Liverpool on March 1, Mr. J. E. STACEY described some cases of *prolapse of the urinary tract through the external urinary meatus*. These included two of prolapse of the urethral mucosa in sisters aged 75 and 73; the prolapse presented through the orifice as a dark plum-coloured gangrenous mass about an inch in diameter, causing dysuria in one patient and some bleeding in the other. Both made an uneventful recovery after excision of the protrusion by diathermy. In another case a blue firm mass of about the same size appeared at the urethral orifice after a bout of pain and vesical tenesmus. At operation the mass was found to be a congenital pouch of the bladder wall; it reduced itself spontaneously as soon as the bladder was distended with fluid, and was easily ligatured and removed from the bladder through the dilated urethra. A woman of 43 consulted her doctor because a smooth purple piece of tissue, about 2 in. long, was protruding through the urinary meatus; she had had three months' amenorrhœa, so the doctor thought it was a piece of placenta following an incomplete abortion, and tried to pull it away with his fingers. After dilating the urethra, Mr. Stacey found that the mass was attached to the right side of the bladder in the region of the right ureteric orifice. It was tied off and cut, and turned out to be a papilloma of the bladder, which had undergone torsion at its base, and a portion of the right ureter. The

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headaches, their presence for so long before the confinement and their persistence afterwards suggest that they were not related to the meningitis.

REFERENCES

Barrett, G. S., Rammelkamp, C. H., Worcester, J. (1942) *Amer. J. Dis. Child.* **63**, 41.
Kohlbry, C. O. (1942) *Minnesota Med.* **25**, 200.
Pearlman, L. N., Bell, R. G. (1944) *Arch. Pediat.* **61**, 75.
Stallworthy, K. R. (1943) *N.Z. med. J.* **42**, 165.

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patient made an uneventful recovery, and cystoscopic examination a few days later showed that both ureters were secreting well, though the right ureteric orifice was about 1 cm. in diameter.

Mr. D. C. RACKER described an *obturator hernia* containing a portion of the right fallopian tube and the distal part of the appendix in a girl serving in the A.T.S. It caused severe pain in the right iliac fossa, associated with nausea, and pain down the leg. The case had been diagnosed as one of gonorrhœa with possible spread of the infection into the fallopian tubes. The correct diagnosis was established by feeling, on vaginal examination, a mass in the region of the obturator foramen, and the contents of the sac were correctly identified at the same time. At operation the ovary was lying close to the opening of the hernial sac, and both the appendix and the right fallopian tube were removed.

Reviews of Books

Biological Actions of Sex Hormones

HAROLD BURROWS, C.B.E., PH.D., F.R.C.S. London: Cambridge University Press. Pp. 514. 42*s*.

Mr. Burrows has written an essay, as he terms it, in which he makes a coördinated summary of the results of laboratory investigations classified under the headings of the four types of sex hormones—the gonadotrophins, androgens, œstrogens, and progestins—with a final chapter on the adrenal cortex. This book will be welcome to many; particularly perhaps to those who have returned to the laboratory after a period of war work and are trying to recapture the mental picture of the field of research in sex hormones and to relate the newest results to what had been discovered before. It is no serious reflection on the quality of the work to say that it falls short of the ideal which might be imagined, in which the subject would be presented as a complete and connected story where detail would illustrate text rather than smother generalisation. The subject is inherently complex because of the multiple interrelations of the actions of hormones. The literature is immense—it might almost be said, monstrous. Contradictory results fill the journals and abstracts. That evil tendency of modern investigation, the pursuit of experiment for its publication value, has been all too evident in endocrinology. To have brought some order out of this chaos and to have made a compilation which can be read with comfort, if only because it is written in clear and good English, is no mean achievement. The outline of the exposition is always plain, though it has still been necessary to write too many successive paragraphs beginning "Smith, Brown, Jones and Robinson (1941) observed that . . . ", and to quote some 4000 references.

It is hardly possible yet to give within an essay of this length a truly synthetic view of the subject, in which a grand natural pattern is discernible after fusion of the mass of detail; nor to confine mention of individual workers to those making contributions of major value. Meanwhile this book achieves its purpose of providing a guide to the literature which will be helpful to those who try to translate the results of the comparative endocrinology of the laboratory into material of use in clinical endocrinology. It is at once a challenge to research-workers to solve many problems and an aid to them in showing the state of exploration of the field.

Health Recovery in Europe

Sir ARTHUR MACNALTY, K.C.B., M.D., F.R.C.P., F.R.C.S., formerly chief medical officer to the Ministry of Health; W. FRANKLIN MELLOR, formerly member of the health section of the League of Nations Secretariat. London: Frederick Muller. Pp. 180. 7*s*. 6*d*.

IF alternative titles were still in fashion, this book might be called *Health Recovery in Europe, or a Brief for Hercules*. Its facts will give the general reader much to think about. Evidence of the miserable condition of Europe today has been accumulating since before the Allied invasion of the Continent, and has made it clear that a vast and urgent problem exists. But there has not been enough information to maintain popular attention at a pitch where practical help is forthcoming on a sufficient scale. No-one will be interested in a subject on which he is not well-informed, and action only follows interest. The chief merit of MacNalty and Mellor's book is that it contains a great deal of information; and, though this is necessarily fragmentary, they have pieced together a picture, and have indicated the reasons for the varying effects of German domination on different countries. On this basis they discuss the dangers of epidemic diseases such as typhus and malaria, the difficulties of controlling the large migrations of people back to their homes, the importance of maternity and child welfare, the effects of long-continued malnutrition on the children, the increased incidence of tuberculosis and venereal disease, and the kind of measures that will be needed to overcome the shortage of doctors and medical supplies. Indeed an Augean stable.

More than half the book is devoted to a review of the organisations which have to play the part of Hercules. A clear account is given of the relationship of UNRRA to the national health services of the countries of Europe, which must form the main structure of the future health organisation. Several of these are discussed in some detail, not only to show the kind of immediate help which they will need in order to be effective, but also as examples of the varieties of administration to be found. Facts are provided, too, about the international health organisations operating before the war, which can be used as a basis for the comprehensive new organisation which the United Nations will have to build.

Fertility in Women

SAMUEL L. SIEGLER, M.D., F.A.C.S., obstetrician and gynæcologist to Brooklyn Women's Hospital. London: Heinemann. Pp. 450. 35*s*.

Fertility in Men

ROBERT SHERMAN HOTCHKISS, M.D., lieut.-commander U.S.N.R., associate professor of urology, New York University medical college. London: Heinemann. Pp. 216. 25*s*.

THESE companion volumes, sponsored by the National Committee on Maternal Health and first published by Lippincott in the U.S.A., are valuable additions to the literature of fertility and infertility; in fact, together they provide the most compact, well-balanced, and comprehensive source of information yet available; and now that public interest in infertility is so lively they should be in the hands of every practitioner calling himself a family doctor. They describe the physiology of reproduction in both sexes and the ætiology of infertile matings; they make clear how these should be investigated and how a balanced diagnosis and scheme of treatment can be reached. That both the authors have had wide practical experience in their particular spheres is very apparent, and much of what they have to say is from first-hand observations; at the same time useful lists of references for wider reading are given at the end of each chapter. Both books contain numerous tables and diagrams to clarify the text, and the illustrations, more particularly in Dr. Siegler's, are excellent. The schedules shown for the taking of histories and methods of investigation are rather alarmingly exhaustive; clearly they do these things more thoroughly in America, where expense is less of an object. Nevertheless, proper emphasis is placed by the two authors on the important points, and on the essentially bisexual character of the problem. Dr. Siegler denounces laissez-faire and the extended use of contraception before a first pregnancy; since, he says, "the normal change in fertility with advancing age is a fundamental factor in all critical studies of infertility and since the incidence of cures is inversely proportional to the duration of the infertility . . . it is to their advantage that childless couples be investigated as soon as possible . . . there is nothing to gain and much to lose by procrastination." Moreover, he suggests as an axiom "Don't give up the ship"; for pregnancy may occur despite the most dismal outlook, and "some marksmen require more shots to hit the target." (Whether this refers to the husband or to the investigating doctor is not clear.) He wisely gives a particular caution against dogmatism in all matters relating to diagnosis, prognosis, and treatment of sterility and infertility: the condition may be alleviated spontaneously and conception take place despite the presence of recognisable defects in either partner.

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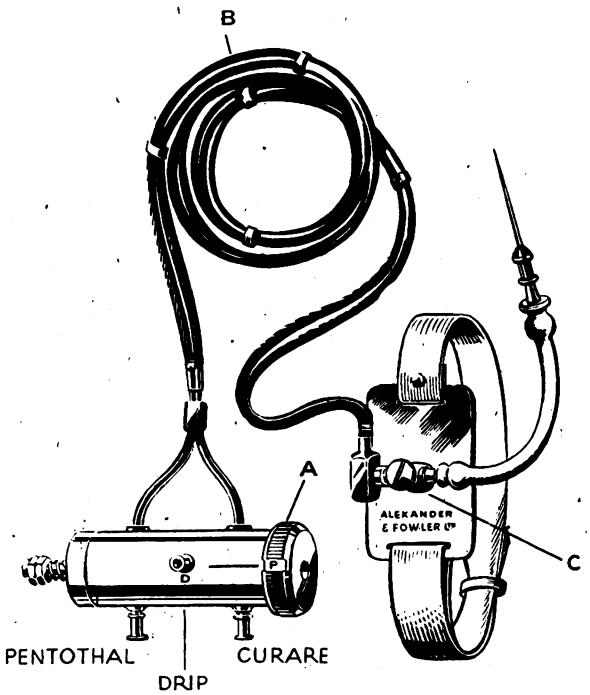
New Inventions

APPARATUS FOR ADMINISTRATION OF PENTOTHAL AND CURARE SOLUTIONS

THE introduction of the use of curare has produced a method of obtaining adequate relaxation at any time during the course of anæsthesia. This property makes it a valuable adjunct to the use of 'Pentothal,' and the combination of these drugs can produce anæsthesia suitable for major abdominal and thoracic surgery. Administration over a long period, however, is often troublesome, and the following apparatus has been designed to facilitate the technique.

The apparatus (see figure) consists of a combination tap A, two small-bore rubber tubes B of suitable lengths, connected to a right-angled junction which fits into an anchoring device C. This is mounted on a metal plate, which is strapped to the splinted arm. A small length of transparent tubing with male and female ends connects the junction to the needle. A drip of saline, blood, or plasma, as required, is attached to the central inlet of the apparatus, and pentothal or curare solution can be injected from 'Record' syringes into their respective inlets. Adjustment of the tap permits only the required solution to flow to the needle, and the possibility of backwash is eliminated.

Pentothal is delivered through one of the small-bore tubes, and the drip solution through the other. The curare, when injected, mixes with the drip solution, ensuring adequate dilution and removal of any residual



pentothal from the neighbourhood of the needle. In this way precipitation is prevented.

Before use, air is cleared from the tubes by running through to the needle first the drip solution and then pentothal. Successful venepuncture will be indicated by a reflux of blood into the transparent tubing. The whole apparatus can be sterilised by boiling.

The tap has thus the following special features:

(1) Blockage of the needle is prevented by a continuous drip of saline, plasma, or blood.
(2) Pentothal is delivered not into the drip but directly to the needle, thus ensuring immediate action.
(3) Precipitation of the curare in concentrated solution by the pentothal is prevented.
(4) Remote control of the administration of the anæsthetic is attained, and the possibility of accidental withdrawal of the needle from the vein eliminated, whatever the required position of the limb.
(5) The apparatus is simple and foolproof, enabling the anæsthetist to concentrate on the condition of the patient.

We make no apology for introducing yet another "method for the use of continuous pentothal," since the physical difficulties of this combined administration would otherwise prohibit its widespread use.

For the construction of this device we are indebted to Messrs. Alexander & Fowler, Pembroke Place, Liverpool, from whom it may be obtained, and who supply a convenient stand for use with it.

T. CECIL GRAY M.B. Lpool, D.A.
G. V. OSBORNE M.B. Lpool
David Lewis Northern Hospital, Liverpool.

AN EPISIOTOMY DIRECTOR

IN performing a mediolateral episiotomy there are two advantages to be gained by placing the stitches before the perineum is incised. This applies particularly when the operation has to be conducted under difficult conditions and with inadequate assistance. The advantages are (1) a bloodless field; and (2) a more accurate apposition of the tissues by preventing the backward retraction of the muscles.

To facilitate the operation I have designed a simple director (fig. 1), which serves the double purpose of

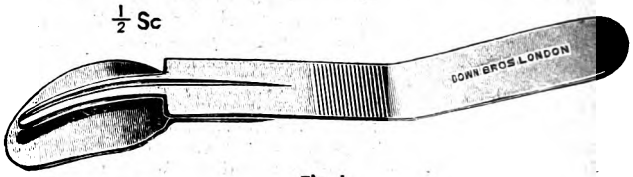


Fig. 1

protecting the fœtus when the needles are passed, and protecting the underlying sutures when the perineum is divided. It consists of a suitably curved handle with a serrated thumb grip for the assistant, a director, and a fœtal "guard." Both director and guard are parallel and slightly curved. The gap between the director and guard is about ⅛ in. throughout, and both are absolutely rigid, which is essential.

Method of Use.—Both guard and director are placed beneath the perineum. The needles may then be passed boldly through the tissues on one side of the director until the guard is touched, then skidded along the guard under the director to emerge from the perineum on the opposite side. When the required number of stitches have been passed, the ends, right and left respectively,

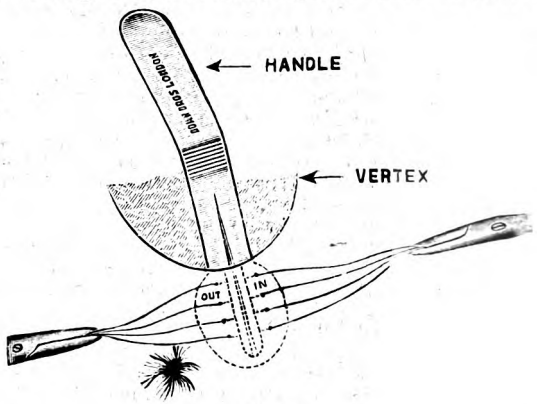


Fig. 2

are grouped, clipped with two hæmostats, and laid aside until the delivery has been completed (fig. 2). Knife or episiotomy scissors can now safely divide the perineum without risk to the underlying sutures. I have found a no. 4 half-curve Hamilton Bailey needle suitable for the purpose.

My thanks are due to Messrs. Down Bros. Ltd., who make the director, for their coöperation.

NORMAN FLOWER B.M. Oxfd

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THE LANCET

LONDON: SATURDAY, MARCH 30, 1946

Congenital Defects from Maternal Malnutrition

ANTENATAL pædiatrics, as Prof. L. G. PARSONS lately emphasised in his Blair-Bell lecture, is one of the most promising subjects for further study. For German measles early in pregnancy is not the only possible cause of fœtal maldevelopment which recent work has revealed. The experiments of WARKANY and others in the United States have demonstrated that in animals dietary deficiencies in the mother may produce congenital defects in the offspring. It remains to be seen how far their findings apply to human congenital defects.

Extensive studies have been carried out on the effect of maternal diet and income-level on the incidence of stillbirth and prematurity (the cause of over half the neonatal deaths), and on the physical status of the infant; the inquiries should now be widened to include congenital defects. The earlier conception of the fœtus as a parasite obtaining all the essentials for its development at the expense of the mother must now be qualified, particularly with regard to vitamins other than vitamin C: as WARKANY [1] expresses it, "in the struggle for nutritional factors between mother and offspring it is not always the fœtus who obtains what he needs." A dietary deficiency in the mother not severe enough to produce gross clinical signs may yet produce florid disease, such as beriberi or cretinism, in the infant, while in rats a deficiency in riboflavine not sufficient to cause infertility may result in gross malformations of the offspring. It should be remembered that there is not necessarily a simple correlation between malnutrition and social level, since an ill-balanced diet with a surplus in one element may result in a deficiency in another; similarly a diet which would normally be considered adequate may, because of metabolic disturbances or the increased demands of twin fœtuses, produce deficiency symptoms in special instances.

A further vulgar error is that congenital abnormalities which are known to be genetically determined cannot be influenced by environmental factors. It has been shown that genes can sometimes be modified by environmental, including nutritional, factors, and there is evidence that similar or identical abnormalities can be produced either by inheritance or by environment. The familial incidence of hare-lip and cleft palate has been thoroughly investigated,[2] but the genetic interpretation of these deformities is not yet firmly established. JUST [3] assumed the action of multiple allelomorphs, and suggested that "the minor forms of manifestation" followed a dominant and the severe forms a recessive mode of inheritance, while DROOGLEEVER FORTUYN [4] concluded that the two conditions are inherited as a double recessive trait, one gene being autosmal and the other sex-linked (hare-lip being twice as common in males as in females). WARKANY and colleagues,[5] approaching the problem of congenital abnormalities from an entirely different aspect, have shown that a more or less characteristic pattern of congenital malformations occurred in the offspring of female rats fed on a standard diet deficient in riboflavine, whereas those of females of the same strain fed on an adequate diet had no defects; and cleft palate was part of this pattern of abnormalities. Cleft palate was observed in 44 (14·7%) of 300 young rats, the progeny of mothers reared on the deficient diet. When females were fed on the same diet supplemented with 2% of dried pigs' liver (which is rich in riboflavine) the offspring were normal; similarly when the males who had fathered abnormal litters were later mated with females fed on an adequate stock diet the offspring were normal. It is obviously impossible to apply these findings to human subjects without much further investigation, but they suggest that dietetic or other environmental factors may account for some of the discrepancies noted by different observers seeking a purely genetic explanation of the incidence of cleft palate in human subjects.

The most striking feature of the reports of congenital defects from rubella has been that in every case the mothers had German measles in the first three months of pregnancy. WARKANY, on the basis of his animal experiments, emphasises the importance of diet in the same stage of pregnancy, and points out that it is usually in the later months that dietary supplements are given. It seems that the embryo passes through critical phases of development, in which particular structures may be affected by either dietetic deficiencies or toxic agents (e.g., virus infections). Thus WARKANY and colleagues [6] found that the malformations described in rats were not determined before the thirteenth day of gestation, and that liver supplements could prevent their occurrence up to this time. Once malformations had been established supplements to the maternal diet might result in the fœtus going to term but could not correct the malformations. The critical stage for rat embryos, when the change from mesenchyme to membranous skeleton might be impaired by a deficiency of riboflavine and congenital abnormalities occur, was at 13–14 days. Similar observations were made by HALE [7] on the effect of prenatal deficiency of vitamin A on the offspring of sows who had been fed on a deficient diet for 150–200 days before mating and during the first 30 days of gestation—the time during which the pig's eye is formed. The offspring showed microphthalmos or anophthalmos and a variety of other malformations, including hare-lip, cleft palate, and accessory ears. Supplements of cod-liver oil given after 30 days' gestation enabled the sows' pregnancy to go to term, but failed to correct the malformations. The same sows given cod-liver oil supplements throughout the whole of gestation produced normal offspring. Congenital malformations in the offspring of sows fed on a diet

1. Warkany, J. Prenatal Nutritional Deficiency. In *Vitamins and Hormones*, ed. Harris, R. S. and Thimann, K. V. New York, 1945, vol. III, p. 73.
2. Uebermuth, H. *Arch. klin. Chir.* 1938, **193**, 224.
3. Just, G. *Arch. Rass.- u. GesBiol.* 1934, **24**, 208; *Z. Morph. Anthr.* 1930, **34**, 120.
4. Droogleever Fortuyn, A. B. *Genetica*, 1935, **17**, 349.
5. Warkany, J., Nelson, R. C., Schraffenberger, E. *Amer. J. Dis. Child.* 1943, **65**, 882.
6. Warkany, J., Nelson, R. C., Schraffenberger, E. *Ibid*, 1942, **64**, 860.
7. Hale, F. *Texas St. med. J.* 1937, **33**, 228.

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deficient in vitamin A were also observed by ZILVA and his co-workers [8] many years before.

It cannot be assumed that particular deficiencies will exert the same effects on embryos of different species, but these experimental results should stimulate further interest in maternal diet before and during pregnancy. There are already grounds for believing that improvement of maternal diet is an important factor in avoiding premature birth, and if the incidence of congenital deformities can be reduced by the same means, an advance will have been made in one of the most baffling and depressing corners of the medical field.

Penicillin in Early Syphilis

WHEN, more than two years ago, it was shown that penicillin would speedily heal the early lesions of syphilis and reverse positive serum tests, with negligible toxic effects, a wave of hope and enthusiasm arose like that which followed PAUL EHRLICH'S discovery of '606' more than thirty years before. Although the arsphenamines did not fulfil the early hopes, they proved an immense advance in the treatment of early syphilis, and offered the strong probability of cure to those who could withstand their toxic effects and would attend regularly for treatment over a long period. The difficulty of ensuring continuity in antisyphilitic treatment has been a fruitful cause of failure. It was much accentuated in the recent war by the conditions of movement which prevailed both in and out of the Services, and resulted in the search for a quick cure through intensive treatment with arsenicals. By this means it was possible to obtain a satisfactory proportion of successes with treatment lasting a few weeks, or even a few days; but serious toxic effects increased in direct ratio to the degree of intensification.

Penicillin looked like the solution of this dilemma, and the drug has been extensively used as the sole treatment for early syphilis both here and in the United States. Intensive study and some years' experience are required before it will be possible fully to assess results, but the evidence already available shows that the battle is not yet won. Up to a point, the incidence of relapse in patients treated for early syphilis with penicillin alone is inversely proportional to the dose. In MOORE'S series,[9] all patients treated with 60,000 units, and three-quarters of those treated with 300,000 units, relapsed; whereas with a total dosage of 600,000 units the relapse-rate was 40%, and with 1,200,000 units it fell to 15–20%. LEIFER [10] treated 96 cases, injecting 20,000 units intramuscularly every three hours for 7½ days—a total of sixty injections amounting to 1,200,000 units—and 8 cases relapsed (8·3%). All but 12 of these patients had been observed and tested for more than six months, and 72 of them were under observation for twelve to twenty months. In June, 1944, penicillin was adopted as the routine and only treatment for early syphilis in the United States Army in the European theatre of war. The dosage was 2,400,000 units given in 7½ days as 40,000 units intramuscularly every three hours day and night for sixty doses. In October, 1944, the same scheme was introduced in the British Army. PILLSBURY [11] reviewed the results in 5000–8000 U.S. Army patients one to ten months after treatment and estimated the incidence of infectious relapse as 1–2%. Of 792 patients whose serum reactions were tested six months after treatment, 13% had positive Kahn tests. Evidence from the British Army was presented at the Royal Society of Medicine [12] on Feb. 12. J. M. MARSHALL had followed 67 patients for six months after treatment and noted 10 failures, of which 2 had persistently positive serum tests and 8 relapsed. From the Military Hospital, Preston, it was reported that 105 cases were under observation for a similar period and there were 16 failures, with infectious surface lesions in 14 cases. In these three groups, therefore, the proportion of failures was the same—15%. In a War Office survey of 270 cases observed for six months, relapse or resistance occurred in 8%.

One of the main disadvantages of treatment with penicillin, as used until recently, has been that regular administration by day and night necessitated the admission of patients to hospital for at least a week. Apart from the strain it puts on hospital accommodation, inpatient treatment has obvious drawbacks for the patient who wishes to conceal his condition. This has led to attempts to treat early syphilis in the ambulant patient by giving doses at longer intervals. LOURIE and his colleagues [13] in Liverpool sought to offset a reduction in the number of injections by giving a larger dose at each injection, in the hope that high levels of penicillin in the blood for a short time each day might compensate for low levels during the night and in working hours. They gave three doses, each of 600,000 units, at hourly intervals on each of five successive days to 17 patients with primary and secondary syphilis. All responded well with rapid disappearance of symptoms and signs and reversal of the blood Wassermann reaction from positive to negative. These cases had been followed for twenty-eight weeks, and in only 1 had the serum reaction relapsed to positive. Similar investigations were undertaken by LLOYD-JONES and MAITLAND,[14] in the Royal Navy, and the former has recently summarised the results up to date.[15] Cases of primary syphilis have received a single injection of 300,000 units each day for thirteen days, or 500,000 units a day for ten days. For secondary syphilis the routine course was 300,000 units daily for sixteen days, or 500,000 units daily for ten days. Of 370 patients treated in this way, 295 had been under observation for one to seventeen months. In 223 men with primary syphilis there were 12 cases of relapse. Other attempts to solve the problem of ambulant treatment have been made using substances which retard the absorption of penicillin, such as the mixture of peanut oil and beeswax described by ROMANSKY and RITTMAN.[16] In this country HARRISON,[17] with the coöperation

8. Zilva, S. S., Golding, J., Drummond, J. C., Coward, K. H. *Biochem. J.* 1921, **15**, 427.
9. Moore, J. E. *Amer. J. Syph.* 1945, **29**, 185.
10. Leifer, W. *J. Amer. med. Ass.* 1945, **129**, 1247.
11. Pillsbury, D. M. *Brit. J. ven. Dis.* 1945, **21**, 139.
12. See *Lancet*, Feb. 23, 1946, p. 270.
13. Lourie, E. M., Collier, H. O. J., Ross, A. O. F., Robinson, D. T., Nelson, R. B. *Ibid*, 1945, ii, 696.
14. Lloyd-Jones, T. R., Maitland, F. G. *Brit. J. ven. Dis.* 1945, **21**, 166.
15. See *Lancet*, 1946, i, 272.
16. Romansky, M. J., Rittman, G. E. *Bull. U.S. Army med. Dep.* 1944, **81**, 43.
17. Harrison, L. W. See *Lancet*, 1946, i, 272.

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of several public clinics, has begun large-scale experiments along these lines. The procedure has been to give a single dose of 300,000 units of penicillin in retarding substance daily for eight days; and it is now proposed to treat a series of cases with injections of 300,000 units twice daily for five days. These and other forms of treatment with penicillin used in civil life are supplemented with a full course of arsenicals and bismuth—a combination of the old and the new which reflects a feeling of disappointment with results obtained with penicillin alone. MARSHALL[12] combined standard dosage of penicillin with 14 intravenous injections of arsphenoxide in twenty days, and in other cases with 10 daily injections of arsphenoxide. He treated 360 cases in this way and followed a third of them for four to six months, during which 5 patients developed infectious lesions, but one may have been reinfected.

These modifications of what has come to be regarded as the standard dosage of penicillin in the treatment of early syphilis, whether by infrequent massive doses, by retarding substances, or by combination with arsenicals, bismuth, or both, are therefore based either on the wish to make the treatment ambulant or on the early failures of treatment with penicillin alone. With regard to the latter, it may be argued that the published reports refer to small groups and are mostly the results of individual efforts—how do they compare with the unpublished results in the large numbers of Service patients with early syphilis treated with penicillin alone? Clearly there are difficulties in the assessment of these cases, for many of the men have returned to civil life and an immense amount of clerical work would be needed to follow their subsequent history. Nevertheless the information is essential for the planning of further schemes of dosage. Such an investigation requires money and personnel, and there is a good case for the wise allotment of both to a subject so vital to the public health.

Beef, Brawn, and Biochemistry

THE Oxford and Cambridge boat race is being rowed from Putney to Mortlake again this year for the first time since 1939, and on Saturday the Tideway will look its pre-war self once more. The rowing tradition has been kept alive at both universities in the interval, but in one respect things have been very different. Before the war the boat crews, even of the colleges, were fed during the weeks of strict training for a race on a special gargantuan diet unknown to most people in this country, with the idea that a breakfast of porridge, fried fish, beef steak, and toast and marmalade, with other meals to match, was essential for the final development of brawn and muscle. These ideas may have been a little out of date scientifically, but in some respects the universities *were* a little out of date, or at any rate slow to change, and the rowing breakfasts had been instituted only so far back as the 19th century—they were, relatively speaking, the latest thing. But now all this is changed. Rationing has levelled out the food of rich and poor, scholar and rowing man, and doubt has been expressed whether crews can be trained satisfactorily on current rations. These doubts argue a lack of knowledge about the fundamental requirements for muscular exercise, and those expressing them forget the heavy work which many people have done on civilian rations throughout the war. Provided that a man is supplied with sufficient calories and a diet which is biologically sound there is no reason to believe that he cannot work as hard and as well on one ration as another. There is no reason, for instance, to suppose that beef steak is any better for him than dried milk or cheese, or that the present rations are not adequate for all purposes, provided that potatoes and bread (of 80% or preferably 85% extraction) are unrestricted. This was demonstrated early in the war in an experimental study of rationing by MCCANCE and WIDDOWSON.[1] Their party lived for months on rations of meat, sugar, fat, milk, &c., which were much smaller than Britain has ever been asked to face, and were fit for severe muscular exercise at the end.

We are still lamentably in the dark about the biochemical changes in the muscles which must accompany training and fatigue. Before the war the subject of training received considerable attention at the Russian University of Kiev, and the findings have recently been briefly reviewed in English by PALLADIN.[2] The work has unfortunately been done only on animals, so it gives us no inkling of the causes of the subtler changes such as stiffness and staleness; but intermittent exercise of one limb was shown to increase the amounts of phosphocreatine, carnosine, phosphatides, free cholesterol, sodium, calcium, and magnesium in the muscles. It seems strange that the sodium should increase since this is generally regarded as the extracellular ion. This group of investigators have satisfied themselves that "trained" muscles contain more of the oxidising and metabolic enzymes than untrained ones, and hence lactic acid accumulates less rapidly for a given amount of work. In consequence, a trained muscle does not reach the point of fatigue as rapidly as an untrained muscle, and is capable of greater work. A totally different aspect of fatigue has been investigated by HUIDOBRO[3] in Santiago. It appears from his work that caffeine and allied drugs prevent the onset of fatigue in the muscles of cats anæsthetised with pentobarbitone. It is suggested that the drugs act by increasing the responsiveness of the receptor substances to acetylcholine, and it is improbable, therefore, that this work will turn out to have any direct connexion with that done in the Ukraine. The Russian workers believe that a plentiful supply of ascorbic acid and thiamine are essentials for training and that acid-forming diets are beneficial. PALLADIN concludes his article by posing the question "whether by varying the diet it is possible to make the muscle more receptive for training, for more rapidly increasing its work capacity, or for delaying the onset of fatigue."

These questions are not new but they are of especial importance today when the world is short of food. If it is true that roast beef and sugar can improve an adult's muscular efficiency, then it is time that this was established by experiment. If it is not true—and the scientific work on man is against it—then it is time the dogmas about training rowing crews were revised, and the armed forces considered sharing out

1. McCance, R. A., Widdowson, E. M. *Spec. Rep. Ser. med. Res. Coun., Lond.* 1946, no. 254: in the press.
2. Palladin, A. V. *Science*, 1945, **102**, 576.
3. Huidobro, F. *J. Pharmacol.* 1945, **84**, 380.

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some of their meat ration with the civilian population. And when these problems have been solved for adults, the same problems will have to be tackled for the adolescent. If only we knew the simplest diets that provided the biological desiderata for all ages and occupations, we should be well on the way to solving the problem of the nutrition of the world.

Annotations

COMBINED OPERATION

THE first of the meetings organised by the Royal Society of Medicine for the discussion of developments in war medicine hitherto on the secret list showed that war-time research was integrated at every stage, whether between civilian and Service doctor, doctor and layman, or, in the wider sphere, between the allied nations. Speaking in a discussion of the problems of heat and cold, Surgeon Captain Macdonald Critchley [1] recalled that two hundred years ago sailors were impressed in the clothes they happened to be wearing; but naval captains came to appreciate the association of dirt with the spread of diseases such as typhus, and in 1798 slopships were introduced for washing, scrubbing, and reclothing entrants. But only since 1939 had the control of naval uniform been treated as a medical and scientific problem. In considering the effectiveness of various textiles against cold, many properties must be studied, including their capacity as thermal regulators, their weight, insulation, permeability, and porosity; the influence of wind on them, and the effect of wear. There was now a predilection for closely woven cotton and many-layered light cloths, in preference to a thick material. Norwegian ski-troops had found the Brynje system satisfactory for hard work with frequent rests in cold climates; this consisted of a string vest, outside which was worn a wind-proof garment, lined with fishing net, with a 'Zipp' fastening which could be opened at the neck during work. Field trials in Canada, undertaken jointly by the navies of Britain, Canada, and the United States, had shown that insufficient attention had been paid to insulation of the extremities and proper closure at the wrists, neck, and ankles. The traditional Eskimo garment, or anarak, had been manufactured in modern textiles; the British Navy now used trousers and coat of blanket material and an outer smock, with hood; this was especially suitable for dry cold climates. Electrically heated suits had been developed by the R.A.F.; these would obviously be useful in the Navy, particularly for watchkeepers in exposed positions. In Norway, one-piece rubber air-tight immersion suits had been developed for pilots and sailors adrift; the Germans had introduced a foam-producing immersion suit, insulated by layers of bubbles, but these had not proved satisfactory.

For Servicemen in tropical climates, clothes must be light, provide cover from the sun, be of the right colour to reflect the sun without being conspicuous, and protect against the effects of flash and the entry of stinging insects and other disease-bearing organisms such as leeches and ticks. The suit must be loose and comfortable, to prevent prickly heat; it must absorb anti-gas and insect-repellent materials, and protect against jungle thorns and foliage. It must be long-wearing, and not subject to tropical rot; and it must at the same time repel water and absorb sweat. Two types of cloth were to be considered—the loosely woven, which was effective except in its failure to exclude mosquitoes; and the closely woven cotton material, or Shirley fabric, which was good but unprocurable. The American Forces had experimented with 'Nylon,' and at the end of the war were compromising with a loosely woven material used in conjunction with mosquito-repellents, of which they had copious supplies. The form of hat must be chosen from the beret, bush-hat, peaked cap (as worn by the Afrika Corps), and the hat with a wide brim. For footwear, sandals were preferred by the Navy; in the jungle two types were needed—heavy marching shoes and rope-soled canvas-topped shoes. The Japanese had used rubber-soled jungle shoes (not as effective as the rope-soled), and loin-cloths in place of underpants. The correct distribution of the weight of the pack on the back was an important question for the anatomist; the Japanese had added several holding-straps to the shoulder-harness, which enabled the soldier to take part of the weight off his back by gripping with each hand. Captain Critchley looked to the day when new equipment would be systematically developed from the initial stage of the report on the pros and cons of the article in use; this would be followed by a round-table conference on the new pattern or textile; then would come tests in the physiological laboratory; the distribution of samples to picked troops for use in conditions simulating the environment in which it was eventually to be employed; users' trials, with the distribution of questionaries; reports by special observers on how the troops fared with the new equipment; and finally the recall of the equipment for study of wear.

1. See Critchley, M. *Brit. med. J.* 1945, ii, 145, 173, 208.

TROPICAL NEURASTHENIA AND THE EFFECTS OF HEAT

THE latest edition of a standard textbook [1] gives the following possible causes of tropical neurasthenia: tropical infections, especially of a chronic or relapsing type; a monotonous life; the vexations incidental to tropical existence; unpalatable food; insomnia; sexual and other social restraints or excesses; overwork; and the effects of quinine. Apart from the last, and perhaps the metabolic depression or dysfunction due to infections, none of these factors is easy to analyse in physiological terms. Psychologically, it does not seem clear that tropical neurasthenia is a definite clinical entity.

The work done on the effects of heat in the tropical theatres of war in the last few years suggests that psychoneurotic states may be engendered by interference with normal salt and water metabolism or excretion. In 10 cases of "chronic hypochloræmia simulating psychoneurosis" described by Saphir [2] in American soldiers the patients had been in the tropics (area not specified) for as little as 3 weeks or as much as 31 months, and the duration of symptoms ranged from 3 weeks to several months. The symptoms were typically those of psychoneurosis with psychosomatic manifestations, mainly alimentary—headaches, nervousness, irritability, depression, and weakness, together with epigastric distress, nausea, and occasional vomiting. Full examination revealed no physical abnormality except a low blood-chloride level (about 62 milliequivalents per litre; normal controls, 68·4–85·5). Treatment consisted of rest, a full diet, vitamins, and sodium chloride in doses of 4 g. daily, and all symptoms disappeared as the blood chlorides rose to normal. It is interesting to compare Saphir's whole blood chloride figures with those given by Ladell, Waterlow, and Hudson [3] for different kinds of heat syndromes seen in Iraq—normal controls, 81·9; hyperpyrexia, 74·1; heat exhaustion type I, 61·0; heat exhaustion type II, 77·5 milliequivalents per litre. Saphir's view that the symptoms in his cases were due to a chronic salt deficiency is scarcely proved, since his treatment was by no means specific, and the doses of salt used were small in relation to normal daily requirements, especially in a hot climate. Nevertheless, it is clear that some of the less acute forms of failure to adapt to heat may present a clinical picture simulating psychoneurosis.

1. Manson-Bahr, P. Manson's Tropical Diseases, London, 1945, p. 613.
2. Saphir, W. *J. Amer. med. Ass.* 1945, 129, 510.
3. Ladell, W. S. S., Waterlow, J. C., Hudson, M. F. *Lancet*, 1944, ii, 491, 527.

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One syndrome has now been described independently in three widely separate areas—in Iraq, by Ladell and colleagues [3] as "heat exhaustion type II"; in the desert regions of the United States, by Wolkin and others [4] as "thermogenic anhidrosis"; and in New Guinea, by Allen and O'Brien [5] as "tropical anhidrotic asthenia." Waterlow [6] compares the three descriptions and points out that a functional nervous disorder may easily be diagnosed unless the state of the skin is taken into account. A composite picture of the condition is that of an anxious and ill-looking patient complaining of weakness, shakiness, giddiness, and headache. The temperature is raised to about 100° F. The characteristic physical sign is diminution or absence of sweating of the body, but profuse sweating of the head and face. Skin changes are likely to be present. Ladell and colleagues mention a close association with prickly heat in the prodromal period, going on to desquamation during recovery. In New Guinea, the typical appearance was "gooseflesh" caused by hyperkeratosis of the sweat ducts, with reabsorption of sweat via the lymphatics. The American observers do not mention skin changes, but say that the syndrome was often preceded by a period of profuse sweating. Another syndrome with psychoneurotic manifestations is that seen in Iraq and labelled "subacute effects of heat" by Shepherd.[7] It is characterised by a moderate fever lasting up to a fortnight, which may be accompanied by vomiting, muscular twitching, convulsions, and abnormal behaviour. The patients look exhausted and dehydrated, and their mental changes vary from slight disorientation to violent mania.

The biochemical findings in some of these cases are difficult to explain. Peters and Van Slyke [8] say that "the kidneys maintain the electrolyte concentration of the blood-plasma within narrow limits, even in the most pathological conditions. There is every evidence that the renal function is set to regulate composition first and volume second. Consequently, if the body loses salt, it also loses water." One would expect then that chloride excretion in the urine would be greatly reduced before any serious fall occurred in the chlorides of the blood or plasma, and that this fall would be accompanied by polyuria and evidence of dehydration. Yet Saphir's cases seem to have had low blood chlorides with normal urinary chlorides, and this is in accord (apart from differences in the absolute figures presented by each author) with the findings in heat exhaustion type II, as reported by Ladell and colleagues.

SNAGS ABOUT STREPTOMYCIN

MUCH remains to be learnt about the limitations of streptomycin and the reason for its failure in a proportion of infections caused by sensitive bacteria. One explanation may lie in the extreme rapidity with which some organisms acquire resistance to streptomycin. Buggs and colleagues [9] have studied the sensitivities of 212 strains of bacteria from 38 patients under streptomycin treatment for various infections. They found some variation in sensitivity between different strains of the same organism on primary isolation, but many developed a moderate to high resistance after a short period of streptomycin therapy. Strains of *Ps. pyocyanea*, in particular, were very resistant and easily became adapted, confirming the findings of Helmholz [10] that this organism and *Strep. fæcalis* are the most resistant of the common urinary pathogens. (Incidentally, it would be well to carry out comparable tests of drug sensitivity using blood or cerebrospinal fluid as media, since they may provide less favourable conditions for growth than do broth or urine and the findings might give a clearer indication of the clinical effect of the drug.) Miller and Bohnhoff [11] find that repeated subcultivation on streptomycin agar will induce resistance astonishingly quickly in naturally susceptible strains of gonococcus and meningococcus. Before subcultivation the streptomycin tolerance of the strains used varied from 1 to 40 units per c.cm., but after only four to six daily transfers the organisms would grow abundantly on media containing 75,000 units per c.cm.; this was the highest concentration practicable, so it was not possible to determine whether the organisms would acquire an absolute tolerance. Tolerance to penicillin was acquired much more slowly, and there was no evidence that acquired resistance to penicillin increased resistance to streptomycin, or vice versa, which suggests that the two drugs act in different ways. Another contrast between acquired resistance to penicillin and to streptomycin was that the streptomycin-resistant organisms showed none of the changes in shape and physical behaviour characteristic of strains which have become resistant to penicillin. Experiments in mice confirmed the in-vitro findings, and it was clear that the acquisition of streptomycin-resistance involved no loss of virulence. Meningococcal infections which before subculture of the organisms could readily be controlled by 100 units of streptomycin resisted total doses of 15,000 units—the largest amount that could be given without serious toxic effects—when the infecting strains had become resistant.

In this issue Dr. Abraham and Dr. Duthie draw attention to the importance of both the reaction of the medium and the inoculum size in assessing the antibacterial power of various substances. Streptomycin, like other bases, becomes more effective as the number of bacteria present falls and as the medium becomes more alkaline. Since damaged tissues are acid in reaction this may seriously limit its powers in suppurative conditions, although the activity of an acid substance such as penicillin would under similar circumstances be enhanced. Blood and tissue levels of 10–15 units per c.cm. may therefore prove ineffective against sensitive organisms except in infections of the urinary tract, where very high levels can be reached through concentration in the kidney, and the urine can be kept alkaline. These points have to some extent been neglected by earlier workers, because of an unconscious if misleading comparison with penicillin, which is relatively little influenced either by change in reaction or by inoculum size, and against which bacteria show relatively little strain variation or capacity to adapt on exposure to sublethal amounts.

Pharmacological studies in man [12] confirm earlier impressions that very large doses of streptomycin given over short periods exert little or no toxic action. While there is practically no absorption when it is administered by mouth, the drug is well tolerated and retained when given by continuous intravenous or four-hourly intramuscular or subcutaneous injections. It is well distributed through the body fluids and a small amount appears in the cerebrospinal pathways. As a rule half to three-quarters of the total amount administered parenterally is excreted in the urine in the first 24 hours, giving concentrations of several hundred units per c.cm. with the usual therapeutic doses—more than sufficient to eliminate most urinary pathogens. This should render streptomycin one of the most useful of the known urinary antiseptics. Intrathecal administration in doses up to

4. Wolkin, J., Goodman, J. I., Kelley, W. E. *J. Amer. med. Ass.* 1944, **124**, 478.
5. Allen, S. O., O'Brien, J. P. *Med. J. Aust.* 1944, ii, 335.
6. Waterlow, J. C. *Trop. Dis. Bull.* 1945, **42**, 313.
7. Shepherd, H. M. D. *Jour. R. Army med. Cps*, 1945, **84**, 1.
8. Peters, J. P., Van Slyke, D. D. Quantitative Clinical Chemistry, London, 1931, vol. I, p. 1032.
9. Buggs, C. W., Bronstein, B., Hirshfeld, J. W., Pilling, M. A. *J. Amer. med. Ass.* 1946, **130**, 64.
10. Helmholz, H. F. *Proc. Mayo Clin.* 1945, **20**, 357.
11. Miller, C. P., Bohnhoff, M. *J. Amer. med. Ass.* Feb. 23, 1946, p. 485.
12. Zintel, H. A., Flippin, H. F., Nichols, A. C., Wiley, M. M., Rhoads, J. E. *Amer. J. med. Sci.* 1945, **210**, 421; Heilman, D. H., Heilman, F. R., Hinshaw, H. C., Nichols, D. R., Herrell, W. E. *Ibid*, p. 576; Anderson, D. G., Jewell, M. *New Engl. J. Med.* 1945, **233**, 485.

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20,000 units did not produce signs of meningeal irritation, and gave appreciable concentrations in the cerebrospinal fluid over 24 hours. There is however evidence that the drug must be given with caution in some forms of meningitis.

The successful use of streptomycin in experimental tuberculosis in guineapigs by Hinshaw and Feldman [13] has been extended by them [14] and confirmed by others,[15 16] in mice as well as guineapigs. The disease was suppressed though not eradicated in a high proportion of the treated animals, and Smith and McClosky [16] find that streptomycin had a greater therapeutic effect than the disulphone promin, using only a twentieth of the maximum tolerated dose. Combined treatment with the two drugs promin and streptomycin gave results which were better than those previously achieved in the treatment of experimental tuberculosis. In view of these findings, the result of trials in human tuberculosis now being made in the United States will be eagerly awaited, and it is essential that supplies of streptomycin should be obtainable for testing in this country.

DISLOCATION OF THE CRYSTALLINE LENS

IT has long been recognised that the crystalline lens can become displaced, partially or completely, in certain circumstances. It is doubtful whether this ever happens while the zonular fibres remain healthy and intact, but degeneration of these fibres through disease or hereditary weakness may result in displacement of the lens by a comparatively trivial injury.

Considering the delicacy of the ligament that holds the lens in position, displacement after severe injury is surprisingly rare. That this is so may be due in part to the ligamentum hyaloideo-capsulare which attaches the lens to the periphery of the patellar fossa of the vitreous. Prolonged iridocyclitis may weaken the zonule and cause degeneration of the vitreous humour, and is certainly one cause of displacement. Where this inflammation has also produced a secondary cataract, it can happen that a blind eye suddenly clears spontaneously, or following a trivial injury, because the opaque lens has become detached from its moorings and has fallen down into the vitreous chamber. Such an eye would then see large objects well through the resulting clear pupil, though with poor definition, like the blind man of Bethsaida who saw "men as trees walking." It was in an attempt to reproduce this spontaneous cure of cataract by detaching the lens from its ligament and pushing it backwards and downwards into the vitreous that the Indian couching operation was performed. It is a poor operation because the vitreous comes forward to occupy the space vacated by the lens, and glaucoma results.

In 1896 Marfan [17] described congenital symmetrical abnormalities of the hands and feet in which the fingers and toes became spider-like, and Ormond and Williams [18] emphasised the frequency of displacement of the lens in this syndrome. Now that the association of arachnodactyly and ectopic lens is widely known, many families suffering from the condition have been reported. It is also appreciated that an abiotrophy of the lens zonule may occur owing to inherited factors and without any other skeletal abnormality.

Formston [19] has recently investigated displacement of the lens in dogs, in which it is considerably commoner than in man. He found that the disorder was almost confined to two breeds—wire-haired fox terriers and sealyhams; the comparative smallness of these two breeds was not in itself a factor, for the condition has not been observed in pekinese. He confined his investigations to ectopia lentis in wire-haired terriers, for 90 of the 100 cases examined belonged to this breed. He found no instance in a dog under 3 years old, and this would relate the disorder to the ocular abiotrophies of man, which usually become apparent between the ages of 18 and 25. Family histories were not easily obtained, but in 3 instances he was able to examine mother and offspring, and found the same state of lens displacement in mother and child. He concluded that hereditary weakness of the lens zonule was the chief cause of subluxation, and that injury was only secondary. Certainly in dogs, and perhaps in human beings, the condition is more widespread than is at present supposed; for, unless an early diagnosis is made, glaucoma may supervene, with impaired transparency of the ocular media, and minute examination of the lens, and accurate diagnosis, then become impossible.

13. Hinshaw, H. C., Feldman, W. H. *Proc. Mayo Clin.* 1945, **20**, 313.
14. Feldman, W. H., Hinshaw, H. C., Mann, F. C. *Amer. Rev. Tuberc.* 1945, **52**, 269.
15. Youmans, G. P., McCarter, J. C. *Ibid*, p. 432.
16. Smith, M. L., McClosky, W. T. *Publ. Hlth Rep., Wash.* 1945, **60**, 1129.
17. Bellows, J. G. Cataract and Anomalies of the Lens, London, 1944, p. 266.
18. Ormond, A. W., Williams, R. G. *Guy's Hosp. Rep.* 1924, **74**, 385.
19. Formston, C. *J. comp. Path.* 1945, **55**, 168.

NUTRITION IN JAPAN

THE 80,000,000 Japanese live, according to official publications, at a density of 374 to the square mile.[1] A very high proportion of them are engaged in food production, and owing to the topography of the country mechanisation of farms is difficult or impossible. Consequently the small-farm system, with all its wastefulness, is in vogue. Such a density of population cannot be supported without either intensive cereal production and/or industrial development and imports from abroad. A high cereal diet makes for poor physique, while industrial development and importation from abroad demand peace. From a nutritional standpoint the diet of Japan is, and always has been, poor. For the last twenty years their government, recognising that bad diet makes bad soldiers, have strained to the limit the sources of domestic foods, hoping to feed the nation for a few pence per person per day. Cats stuffed with peeled locusts, and grasshoppers baked in soya-bean sauce are some of the recommendations of the director of the Imperial Institute of Nutrition in Japan—advice not unreminiscent of that from ministries of food nearer home. The staple diet of Japan is polished rice, which is more pleasing to the palate and more digestible and absorbable than unpolished rice. The diet therefore lacks protein, fat, and vitamin B_1. Rice, owing to the absence of gluten, cannot be made into bread and must be consumed in a boiled—i.e., bulky—state. The chief other sources of protein are fish and soya beans. The seas around Japan are showing signs of being fished out, and soya-bean supplies, now that Manchuria is lost to Japan, are cut to 40% of what they were before the war. Soya-bean protein, moreover, has a low content of methionine and so is not advantageous for body-building. Shorn of her colonies Japan cannot be self-supporting for food, even food of the low quality produced in those islands. Probably none but light industries will be allowed to the country, and Japanese goods will receive a cold welcome abroad for many years to come. Here is a problem which will cause a major headache in those who plan for the future nutritional well-being of the world. Unless fed by the United Nations, Japan will become a festering sore in the body politic.

LANCECTOMY MADE EASY

THE wrappers which during the war have done so much to promote ingenuity or exasperation among readers of THE LANCET will be replaced next week by others of pre-war pattern. Experienced lancectomists may regret the change, but it is part of post-war progress.

1. Bourne, G. H. *Nature, Lond.* Feb. 16, 1946, p. 177.

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Health Centres of Today

III. BRISTOL

R. H. PARRY
M.D. Lond., F.R.C.P., D.P.H.
MEDICAL OFFICER OF HEALTH FOR BRISTOL

IN 1935, on a new housing estate some six miles from the centre of Bristol, a small centre was built which provided for maternity and child-welfare activities, the treatment of minor ailments, and the examination of school-children, and also had a central surgery and accommodation for the district sanitary inspector. Sufficient clerical staff was provided, and this first health centre became the municipal medical centre for the district. The time was not yet ripe, however, for inclusion, in the same building, of clinics for tuberculosis and venereal disease; nor would the committees concerned agree to poor-law patients being examined at this centre by the district medical officers.

In 1937 two centres of the same kind were erected in two other parts of the city, and on July 9 a central health clinic was opened by Sir Farquhar Buzzard. Besides having facilities for the ordinary school inspection and maternity and child-welfare clinics, this building could accommodate:

1. A tuberculosis clinic, planned for the work of two full-time medical officers.
2. An orthopædic clinic under the supervision of a specialist.
3. Eye, and ear, nose, and throat specialists.
4. An X-ray service, both for diagnosis and for the treatment of ringworm. (This was later extended as a free service to all general practitioners, so that any case suspected of tuberculosis could be examined by a radiologist without reference to the clinical chest specialist.)
5. A training school for health visitors, with a small reference library.
6. Clerical offices, with accommodation for nursing and medical staff.

The cost of this central clinic was just over £50,000.

PROGRESS AND PLANS

Towards the end of 1937, writing from experience of the new branch clinics and the central health clinic, I was able to report that:

> "As a result of the construction of modern, well-equipped buildings, attendances have increased enormously. Your staff unanimously agree that spacious, well-equipped buildings are not only more convenient and efficient from the staff's point of view but are appreciated and respected much more by the people who utilise them. The converse is also true—that the services in Bristol have suffered as the result of inadequate and inefficient clinic accommodation."

In the short time between 1937 and the outbreak of war sites for three further health centres were purchased, and a new one was erected on the site of the municipal hospital. Of all the experiments, the last is perhaps the most interesting, for it forms the model for our future extensions.

The Ministry of Health had always insisted that our "preventive" clinics should never in any way be connected with hospitals; but approval was given for the erection of a branch health centre in the hospital grounds. Here the faults and inconveniences of the other centres were corrected as far as possible It was built on the central-hall principle, having room for maternity and child-welfare clinics, school medical inspection, two dental surgeries, a special suite for the treatment of venereal disease in women and children, a suite for health education, and a small canteen, as well as accommodation for the district sanitary inspector and the staff working on the premises.

Attached to this centre by a corridor is the hospital casualty department, with two consulting-rooms, a special waiting-room, and a canteen. A dispensary is built off the communicating corridor. This second building would be suitable as a health centre for general practitioners, and advantage would be found in this being attached to the municipal health centre, in whose activities the practitioner might take part. A further advantage is that the building is attached to the hospital.

Clinic attendances increased from just under 250,000 in 1934 to over 400,000 in 1944, with about 10,000 attendances a week during the busy periods. This was achieved in spite of the setbacks of the war years, evacuation, shortage of staff, and use of clinics for civil-defence purposes. Yet it is clear that the limited number of health centres are serving too wide an area and too numerous a population.

Besides the central and district health centres, a third type of centre was envisaged for those services (antenatal, postnatal, infant welfare, minor ailments, &c.) which ought to be near the homes of the people using them. The war interrupted the completion of this plan, but in some ways this deferment has been advantageous. In retrospect we can see clearly that the essentials of the scheme for health centres of various grades sited throughout the city have been endorsed by results. Modifications now under consideration are therefore by way of amplification rather than amendment of the original scheme; district health centres will assume greater importance in providing additional services on a "divisional" basis, while the number of small centres will be multiplied so that there shall be one within easy reach of every user.

REQUIREMENTS OF THE CITY

Area to be served by each centre.—For the purpose of defining health-centre areas, a standard based on (1) distance from the home and (2) distribution of population was adopted. A centre should serve an area within a radius of about half a mile, so that patients attending regularly should not have to walk farther than this from their homes. With the change-over from trams to buses, which cannot carry perambulators, little or no account can be taken of public transport in relation to the centres providing infant-welfare services. This

Main waiting hall

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distance factor would not apply to the less frequently used specialist and other services where a measure of centralisation is necessary to economise staff and equipment.

Population to be served.—A district health centre of economic dimensions is able to serve a population up to about 10,000: and that is the standard chosen. Since the last census in 1931 many changes have occurred in Bristol by way of slum-clearance and re-housing, bomb-damage, and overcrowding. The nearest estimate of population which we are able to make without enumeration is 421,000.

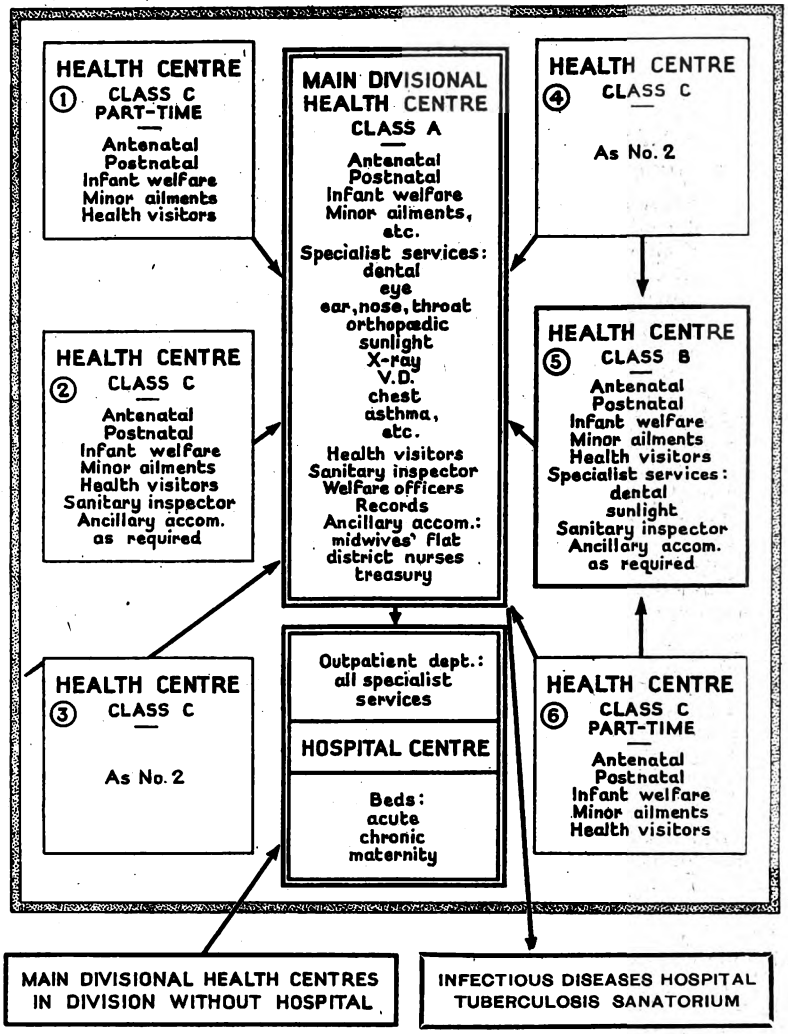
Classification of centres.—Against the two standards of size and population must be balanced the geographical and topographical features of each area; and the existing modern health centres have also to be borne in mind in framing boundaries. When this is done we find that Bristol requires:

6 main divisional areas	having class	A	centres
4 subdivisional areas	,, ,,	B	,,
33 districts	,, ,,	C	,,

The accompanying table shows the scope of each type of centre.

Wherever possible (3 out of the 6), the main divisional centre is to be adjacent to a hospital, present or proposed, where, inter alia, X-ray plant will be available and which the specialist staff will already have reason to visit. The result of this arrangement will be that 3 (or 4) will form "main" centres (for North, Central, and South Bristol). An additional 4 subdivisional areas will be established so as further to decentralise dental and sunlight services, the demand for which lies midway between the localised and other specialist services. These centres will also provide these particular services in certain neighbouring areas. The size of the centre and its opening full-time or part-time will depend on the size of the population at present and the population expected.

Ancillary accommodation.—At the original district health centres the sanitary inspector of the district was given a room which he used as a base and to make contact with the health visitors. The chief sanitary inspector is satisfied that this arrangement should be continued and extended to all centres in sufficiently built-up areas.



Centres and services in a division

It has proved difficult to provide suitable living accommodation for district midwifery staff and pupils in the areas where they work. The planning of health centres in all parts of the city suggests an alternative to the present individual house accommodation and the proposal to establish ad-hoc hostels. It is very hard to obtain houses of the right size, standard, and location; it is not easy to supervise the staff in scattered premises; and reliefs and transport remain a problem. Some of these difficulties would be solved by hostels, but the problems of domestic services, building maintenance, and transport would remain. To have a flat for midwife and pupil at selected health centres would be a further step towards the concentration of all health services in the recognised building and would ultimately solve most of these administrative problems.

The accommodation of district nurses in hostels has been decided upon and these are to be the bases from which the nurses will work; the hostels will be few, however, and in some outlying districts the provision of a sterilising-room would be desirable.

The city treasurer is of opinion that district offices should be provided for the receipt and payment of moneys. These offices would deal mainly with local rates, electricity, housing, allotment rents, health, and other accounts; they would also be convenient for paying salaries to employees, and be the base for corporation collectors. A general office with a counter, and a private room are suggested.

Medical practice.—The question of incorporating the district medical services (under the public-assistance committee) with the health-centre service has been considered. The time is now ripe for this reform, and provision for diagnosis and treatment by the district medical officer should be made in all health centres. If other general practitioners are to be accommodated at the health centre considerable extensions will of course be necessary.

SITE AND BUILDINGS

In general, the choice of site will be governed by its relation to the focal point of the area, accessibility, gradients, and town-planning proposals. It is considered that a site of about 1–2 acres would be enough for the

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SERVICES AT HEALTH CENTRES

Class A Main Divisional Health Centre	Class B Subdivisional Health Centre	Class C District Health Centre
ntenatal: routine	Yes	Yes
ntenatal: consultant	No	No
stnatal	Yes	Yes
rth control	No	No
erility	No	No
fant welfare	Yes	Yes
edical inspection	Yes	Yes
inor ailments	Yes	Yes
mmunisation	Yes	Yes
abies baths / utpatients	No	No
ispensary (drugs, foods, &c.)	Limited	Limited
ecialist services—		
dental	Yes	No
sunlight	Yes	No
eye	No	No
ear, nose, throat	No	No
orthopædic	No	No
X-ray	No	No
V.D.	No	No
chest	No	No
asthma	No	No
foot clinic	No	No
ealth visitors: records	Yes	Yes
anitary inspectors	Yes	Yes
elfare officers (including social welfare)	No	No
idwives (residential accommodation as required)	..	..
istrict nurses (office as required)	..	..
lerical staff: records	Yes	No
ity treasury: cashier and collector	Yes	Yes

Certain services will probably be included in one or more of the hree main centres:—

Administration	Cardio-rheumatism	Backward children
Training school	Speech	Other special clinics
Mass radiography	Child guidance	

uilding and precincts, and also allow for enlargement. 'Temporary" forms of construction could be employed t small centres so that the capital outlay need not militate gainst reconstruction when, with the progress of services nd ideas, this becomes desirable.

The present health centres in Bristol are:

. One central health clinic.
. Four district health centres, built specially for the purpose.
. Four adapted clinics.

Infant-welfare and antenatal clinics are still being held n church halls and school-rooms, but a number of sites ave been acquired for the erection of modern health entres to replace these premises.

Medicine and the Law

Charges of Professional Negligence Fail

In Holt *v.* Davies and the Nottingham General Hospital, decided at the Notts assizes earlier in March, allegations of professional negligence and unskilful treatment failed entirely. Miss Holt, a governess, claimed damages from the surgeon who had performed an operation for hæmorrhoids, and from the hospital, on the ground that a 15-in. swab of cotton-wool had been left in her body and that her health had been ruined thereby. The operation, it was said, had been performed at the hospital on Jan. 30, 1941; she had been discharged from hospital on Feb. 12, though she had fainted from pain on the previous day. On the 26th her sister had called in the surgeon because of the patient's suffering. He did not visit her till March 22, when, it was alleged, he made an examination and declared that the pains were imaginary. On March 24 her own medical attendant called in the district nurse and ordered an enema to be administered. Thereafter the swab came from her; it was shown to the defendant surgeon who was said to have asked the patient and her family not to talk about it. According to her counsel, she re-entered the hospital and was given massage and X-ray treatment; she had been a healthy and athletic woman of 27 before the operation, but was now a complete wreck who had to be carried into court.

The defendant surgeon's evidence was that, during the original examination, the plaintiff wept and behaved hysterically; she then refused the operation but was later admitted to the pay-bed wing where it was performed. Having made the excision, he introduced the tail end of a piece of gauze; its maximum distance inside would be 1½ in.; the remainder he folded over as the first layer of the external dressing; cotton-wool was placed outside this. The surgeon said that he did all this himself; it was utterly ridiculous to suggest that he put in 15 in. of cotton-wool; it would be the wrong material to use; it would tend to come to pieces. No nurses, he said, would have to insert a swab or pack; the nurses concerned were highly competent and had done nothing amiss. Sisters from the pay-bed wing testified that external dressings were properly applied and that cotton-wool was never used for internal dressings at the hospital. Medical witnesses gave evidence that the plaintiff suffered from hysteria and was an anxious, restless, and neurotic type of patient.

Mr. Justice Charles said that the defendant surgeon was of the very highest experience and reputation; it would have been the act of a very unskilful beginner to have done what was alleged. The judge was satisfied that the cotton-wool, however it found its way into the pail, was not introduced into the plaintiff's body by the surgeon; "of that I am quite certain; I have no doubt of it at all." After mentioning the evidence of the records of bowel movement in the hospital books, and the care of the nursing staff night and day, he declared himself satisfied that the swab was not introduced by the servants of the hospital; how it came into the patient's body he did not know. The plaintiff's case, he concluded, had broken down in the face of the extremely careful evidence of the surgeon and of every nurse who had been in charge of the patient. Judgment was given for both defendants and leave to appeal was refused. It was unfortunate, said the judge, that the case had taken so long to come into court; the delay was very unfair to the defendants.

Mr. Llewellyn Davies was represented by Messrs. le Brasseur and Oakley acting for the London & Counties Medical Protection Society.

Liability of Radiological Departments

The *British Journal of Radiology* (1946, **19**, 45) has usefully reproduced Dr. W. M. Levitt's presidential address to the section of radiology of the Royal Society of Medicine on the legal responsibility for accidents in radiological departments. The address covered the respective responsibilities of hospital authorities, radiologists, and radiographers and showed in particular how important was the decision in Gold *v.* Essex County Council in 1942. Previously public hospitals could still shelter themselves under the classic ruling in Hillyer *v.* St. Bartholomew's Hospital, delivered in 1909. Applying the principle of that famous case, the judges have in effect declared that no liability attaches to a hospital which gives gratuitous services to patients for any negligence on the part of the professional staff, whether medical or nursing, provided that the hospital authorities have taken reasonable care to choose or appoint staff properly qualified to carry out the duties concerned. In Gold's case a child, being given Grenz-ray treatment for warts on her face, was severely burned. The treatment had been ordered by the visiting radiologist and was given by the radiographer whom the defendants employed. The defendants pleaded the decision in the Hillyer case in vain.

Readers may be referred to Dr. Levitt's exposition for the significance of the Gold case. In a final section of his address he deals with the liability of manufacturers of apparatus. Lord Atkin's opinions in Donoghue *v.* Stevenson (1932) made clear that, if a maker sells his products in such a form as to show that he means them to reach the consumer without any chance of intermediate examination, he owes the consumer the duty to take reasonable care in their preparation so as not to injure him. That was the case where the purchaser of a bottle of ginger-beer found a snail where no snail should be; the manufacturer, though he had no contractual relationship with the consumer, had to pay for the want of care. Dr. Levitt points out that this principle has been applied to the fitting of a side-car to a motor-cycle; the side-car came loose, the passenger was injured, and the person who fitted it was made liable. So also, in 1940, the purchaser of a reconditioned motor-car obtained damages when a wheel came off next day and he was injured. In the same way, says Dr. Levitt, a supplier of X-ray apparatus or high-tension apparatus will be liable if a defective machine is supplied.

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In England Now

A Running Commentary by Peripatetic Correspondents

So many Service medical officers have worked on Malta that it would be presumptuous for a civilian paying a short visit to record his crowded impressions. But probably few, if any, have officially visited Gozo and been forced to swim for the prestige of the British crown—in March! We motored to the north of Malta on a perfect morning when blue sky and sea, green fields, and yellow buildings were at their best in the softer light of the early sun. St. Paul's Bay swept one back 1900 years or so to the ship-wrecked Jew who brought the news of Christianity far enough to the west to ensure that it would eventually reach the British Isles. Then over a ridge or two and down to the little harbour where the ferry boat, ominously labelled *Franco*, was waiting while two motor-cars were got on board. The half-hour's crossing to Gozo, on a perfect sea, was fully occupied by the M.P. for that island explaining his successful scheme for coöperative farming. On the quay at Mjar the reception committee was terrific: the commissioner for Gozo, the superintendent of police, the M.O.H., and representatives of agriculture, education, and the medical profession stood in an imposing bunch, and a procession of cars set out after the necessary handshakes to bring the whole committee to watch your correspondent and his companion, the chief government medical officer, eat a late and large breakfast at the little Cornish-like hotel overlooking the definitely Cornish harbour. The day's programme then began—schools, hospitals, prehistoric ruins, farms (one with a mongol and another with a cretin, specially selected), and the last working windmill, preserved by a wisely arranged subsidy as a museum piece.

But the bathe was the chief civil event of the day. The casual mention of a bathing costume the day before had made the telephone wires hum. A bay was selected—Marsa Forno, where a group of brightly coloured summer villas clustered round a clear blue inlet. The police station by the water's edge had been warned, a room cleared of all impedimenta, and the necessary bathing equipment laid out: towel, chair, screen, fresh water, and an ominous large proclamation about life-saving (in Maltese) which stared down at me alongside an outsize lifebuoy that was, I hoped, a trifle unnecessary. The whole committee stood by, as well as representatives of the civil population, and of course the local police force. I hope I did well. The water was certainly not cold, and I splashed about to give as good a performance as possible for an amateur. There was no cheering as I returned to the police station. The silent glances suggested that the English professor had done just the mad sort of thing expected of him. He clearly had no choice when it came to the point. The superintendent of police was a big man and quite obviously I should have been thrown in at any sign of shrinking. However honour was satisfied and the bathe provided just that appetite for a large lunch which might well have been lacking after ten days of overeating.

Later in the day we chugged back in a specially chartered fishing boat, threading our way between islands with only the absence of gulls and the clearness of the water to remind us that we were far, far south of the Cornish coast.

* * *

Business must be booming in Quackpole Street. The clients return on the evening train, and judging from their conversation it seems to be an expensive day's outing, what with the morning séance at *x* guineas, the restaurant lunch, and a new hat or a matinée to round it off. But now there are no fly-bombs about it's a relief to go up to town and buy something more satisfying than ordinary rural doctoring. The Canon's wife fairly trumpets about the merchant who tests you for at least 13 dietary deficiencies (alphabetical, my dear, but not the *ordinary* vitamins). It seems that she herself lacks *e* ever so slightly while daughter Sheila just out of the Wrens has *e* to spare but absolutely no *k*. A queer state of affairs but easily put right by the coloured pills in thirteen distinct shades with special labels for the colour-blind. Madam Chairman of the District Nursing Association, usually so unbending, is quite pliant about Bachrigg, the new pathosteopractor who has just started up in Charley Street. Madam is wondering whether Bachrigg could buck up her brown setter, and the local vet had better watch his step. I am most interested however in the manic-depressive secretary of our local art club. A coming consultoid has just given him a series of shots of a secret preparation smuggled over from the Continent and said to be derived from embryonic sheep. Result, an apparently permanent manic phase and the local studio fairly buzzing with orgies of music and the arts. The consultoid refuses remuneration except on the Chinese basis—i.e., nothing if not cured, but, if you think you are, a free-will offering based on your own estimate of your worth. Psychologically a subtle one this, but, I gather, rarely worth less than a hundred guineas a case, instalments spread over three years not being despised—there are more things in medicine and surgery, Aneurin, than are dreamt of in your white-paper.

* * *

The problem of displaced persons is not confined to Europe or even to Europeans. In India and the Middle East there are thousands of Italians, some of whom were captured in General Wavell's Western Desert campaign of 1940. There are, I believe, even more P.O.W.'s and ex-P.O.W.'s in America and Canada. Their chance of returning home in the near future is remote. In the depot where I am at present working 46 nationalities have been represented—I see a round dozen on my daily sick-parade (one rapidly becomes a bit of a linguist, because doing everything through an interpreter takes so long). A large number of Africans have served overseas for three years or more, as have the Mauritians, Seychelle Islanders, Cypriots, and various Arab races. They are beginning to return home again, but it will be a long time, if ever, before everyone is back in his own country.

The desire to get back and settle down is very strong in all races, and the inability to do so causes a feeling of frustration and dissatisfaction. Every effort is being made to combat this by providing entertainments of all kinds, but a sense of frustration cannot be eradicated by entertainment alone. The resettlement of all peoples in their own countries is a task that should be completed as soon as possible—or the consequences may be unpleasant.

* * *

No word in the English language upsets my Labour Council more than "voluntary," particularly when applied to hospital or clinic services. Everything that it qualifies savours of charity, another word almost as foul to their minds. For them, things must be paid for to be efficient; no good can ever come from the founts of love or affection or a gentle kindliness of human nature; virtue is a prerogative of officialdom. It is pathetic to see their faces when the blood-transfusion service is mentioned, and emphasis put, with malicious intent, on the number of volunteers who, month by month, have attended the local municipal hospital as donors. One can almost sense their Hitlerian disgust at this new type of non-Aryan blood, the contaminated plasma of a lover of his fellow man. It makes one wonder what will happen to the transfusion service when doctors, auxiliaries, services, and patients are all "full time"; and if blood-donors will only be accepted on production of their latest rate receipt signed by the borough treasurer.

* * *

We are very strict in the Receiving Room. "Wot! No doctor's letter?" is a prelude to an inevitable polite ejection. The more enterprising R.R.O.'s have now become interested in an empty shop opposite the hospital. They propose to paste pink paper over the windows and put up a plate. "Doctor's letters—no waiting" would be good business, but the scheme has not started as they cannot agree on a modus operandi. One of them wants to write flash letters like "I think this is a Haaken-Scheer syndrome, do you?" but the other prefers artistic restraint, such as "? belly. Thanks."

* * *

This lay interest in Psychology which Commander Campbell deprecates has, at least, led to a more enlightened tribe of buskers. The gentleman entertaining the people queuing for *Œdipus* outside the New Theatre was singing "A boy's best friend is his mother."

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Reconstruction

THE BILL

COMMENT AND CRITICISM

THE British Medical Association announces that special representative meeting will be held on May 1 nd 2 to discuss the council's statement of policy on he National Health Service. This statement, with a opy of the white-paper issued last week, has been ent to all members of the profession.

EMPLOYMENT OF THE DOCTOR

In setting out the principles adopted by the Nego- iating Committee, the B.M.A. council says:

"The doctor's primary loyalty and responsibility should e to his patient. The interest of the public demands that e should be free—as civil servants and local government fficers cannot be—to act, to speak and to write on pro- essional matters according to the dictates of his conscience, nhampered by interference from above. He should never e required, or be in a position to be required, to modify is standards of medical certification at the behest of the tate, however concerned the State may be with the solvency f a Social Security Fund." *

"The doctor should be the patient's doctor and not the overnment's doctor. The doctor's freedom is the public's reedom.

"A whole-time salaried medical service is inconsistent ith free choice of doctor. It would mean the equal distribu- ion of work between equally paid doctors regardless of the ishes and preferences of the public. It would tend to impose uniformity in a form of work in which initiative and riginality are essential. It would tend to bureaucratise what hould be a human service.

"It would destroy what is a proper incentive with most inds of people in most kinds of work, the relationship between emuneration and the amount and value of work done or esponsibility accepted. It might tend to replace competition or patients by competition to avoid them."

In the council's view, the Government's proposals o pay general practitioners a basic salary—particularly f this forms a substantial proportion of the total emuneration—will lead to whole-time salaried service. hough salaries can appropriately be paid to assistants, he remuneration of a principal should be related to the umber of patients on his list. The council also objects o the Government's plan for achieving a better distri- ution of general practitioners, which it describes as direction": "no compulsion, direct or indirect, hould be brought to bear upon any citizen to work n any particular area"; and it is wrong that any octor recognised by the General Medical Council hould have to pass an additional test by which he might e excluded from the National Health Service, either n particular areas or every area.

"If the 'control' proposals are not proceeded with, it ill be unnecessary to interfere with existing arrangements or the buying and selling of practices. The profession can nd will make possible by its organisation the entry or re- ntry of demobilised practitioners to general practice under erms which are not onerous."

n the council's opinion, the doctor's ownership of he goodwill of his practice gives him an independence hich his patients need. But the *Times* (March 22) says:

"The Government have . . . had the courage to put an end o the sale of publicly remunerated practices, a reform now robably supported by at least half of the medical profession."

The Socialist Medical Association regrets that the roposals in regard to the payment of doctors fall hort of the policy which Labour has in the past accepted. 'We still insist that the best service, the perfect doctor- atient relationship, and the highest form of team work, ill be possible only when the service becomes one employing whole-time salaried officers and we shall watch the basic-salary system very closely indeed."

ORGANISATION AND THE HOSPITALS

The council of the B.M.A. criticises the administrative arrangements as "likely to divide the service into at least three compartments, to perpetuate or create barriers between general practitioner and hospital, between hospital and health centre, between the family doctor service and the local authority clinic services, between local authority medical officers and hospital staffs and general practitioners, as well as between the bodies employing them." Moreover, much of the work now done in clinics should be undertaken by general practitioners as part of their normal work for those under their care. The solution is that

"Regional boards should assume responsibility for the planning and administration of hospital and non-hospital medical services alike, for the building, ownership and administration of such health centres as may be developed, for the clinic and other treatment services of local authorities; in short for all treatment as distinct from environmental services."

The B.M.A. council goes back to the Willink plan when it suggests that the Minister "should accept responsibility for all hospital provision and maintenance, voluntary and council, being advised on the allocation of the necessary centrally provided monies by regional bodies," but it is unnecessary and undesirable for him to assume the actual ownership.

Sir Bernard Docker, as spokesman of the British Hospitals Association, put it more strongly at his press conference last Monday. The white-paper, he said, does not contain a single reason, justification, or argument for this step and the very serious consequences to the patient which it involves. "This mass murder of the hospitals and their replacement by State institutions is wholly unnecessary. . . . The whole of the Minister's object and the best interests of the patient can be secured within a comprehensive free national health service without throwing away the most priceless asset in the construction of that service—the voluntary hospitals."

The *Times*, on the other hand, gives the Bill conditional support:

"If it is right today to transfer the municipal hospitals to regional authorities, as the Coalition white-paper advocated with some vigour, it cannot be wrong to transfer the voluntary hospitals too, even though, in the absence of permanent authorities intermediate between local and central government, this transfer in both cases involves vesting the legal ownership of hospital buildings in the Minister of Health. It cannot be wrong, yet it may be unwise. The dangers are obvious enough—rigidity of central control, stifling of initiative among doctors, weakening of contact between patient and hospital management, discouragement of voluntary personal service. But Mr. Bevan's solution of the hospital problem is at least as good as any alternative yet propounded, and his system could be kept free of these obvious evils. It could in fact be so administered as to permit the rapid development of a well-knit yet flexible hospital service throughout the country, with a spirit of healthy competition between the regions. The proposed composition of the regional boards, the local management committees they are to appoint, the provision for house committees, the transfer of voluntary hospital endowments to a special fund to which the public may contribute, the special status proposed for the teaching hospitals—all these elements suggest that Mr. Bevan is aware of the dangers of excessive centralisation and of the need to draw all branches of the medical and allied professions into the work of planning and administration."

The *Times* speaks of the Bill as an "enabling measure designed to give the Minister the powers required to create an administrative framework within which the new system can develop." The B.M.A. council, however, complains that in the absence of detailed information about the composition of regional hospital boards and local hospital management committees, and of the boards of governors of teaching hospitals, it is impossible to judge the merits of the proposed hospital administration. If, for example, the representatives of local health authorities are to be placed in a majority on regional

* Notes issued by the B.M.A. to the press present these arguments as follows: "Inevitably, there will be an urge on the part of the State to cut short all sickness, both to save funds, and to get men back to work. As the Government Actuary has stated, 'a high standard both of medical certification and of administrative supervision' will be necessary. This urge must be translated into pressure on the doctors. There will be both the motive for pressure, and the means to exercise it."

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boards or management committees, the proposals will be in direct conflict with the views of the profession. Though local health authorities are all to have health committees, they are not obliged to coöpt doctors to them.

The B.M.A. executive also urges that it be made impossible for the Minister to appoint to the Central Health Services Council any doctor who is unacceptable to the profession, and it criticises the proposals for the standing committees advising the Ministry, which it considers should be appointed by, and report through, that council.

CONDITIONS OF PRACTICE

On health centres the B.M.A. statement presses for widespread experiment into the merits and demerits of different types. The kind outlined in the Coalition white-paper "can be fairly described as an aggregation of doctors' consulting and waiting rooms, with common nursing and clerical help"; but what general practitioners need, above all, is the provision of facilities for fuller diagnosis, with special emphasis on pathology and radiology. The *Times*, however, points out that "since the doctors working in these centres will not be employed by the local authorities it seems likely that no authority will be able to establish health centres except by prior agreement with local practitioners. Thus, although the present Government have so far not stated that the health centre service is to be treated experimentally, it will almost certainly develop by trial and error and by collaboration between doctors and local authorities."

The building of health centres, the B.M.A. council remarks, will take a considerable time, and pending their construction the effect of the Government's proposals will be not what it seeks, the encouragement of group medicine, but the opposite:

"The abolition of goodwill will of itself destroy the present basis of partnership agreements, breaking up partnerships into units of individual practitioners who may or may not reach arrangements between themselves. This may be still the case when health centres are in action. Further, no indication is given that the Government contemplates, in its proposed arrangements, the status of 'assistant.' It appears that all general practitioners in the proposed service, whatever their age or experience, will practise as individuals."

For consultants the council opposes restriction of the use of private accommodation in a particular hospital to specialists taking part in the new service, and points out that the State, under the proposed arrangements, will control private consulting practice in so far as it is conducted in hospital premises. "There will be scope for people to obtain additional amenities, e.g., private rooms where these are not medically necessary, by payment of the extra cost involved. But it appears that private accommodation will be restricted to particular hospitals where provision can be made 'in separate parts of the hospital,' and that the facilities will be limited to specialists taking part in the new service."

The *Manchester Guardian* (March 22), from a different angle, writes of the grave danger of allowing doctors to take any private fees at all from patients who have already paid in taxes and insurance contributions for treatment by them as participants in the service:

"Poor patients will claim their rights and be convinced that they are getting an inferior service; rich patients—and many others who cannot really afford it—will insist on paying fees in the expectation of preferential treatment, and will go elsewhere if they do not get what they are paying for. This, in short, is a false freedom that can only survive to the extent that it is abused. It must inevitably poison the doctor-patient relationship. It is the reef on which this splendid venture, with all its prospects for development, might founder at the outset."

LONDON

Lord Latham, leader of the London County Council, states that, excluding 189,000 beds in mental hospitals, local authorities provide about 196,000 beds, compared with 77,000 in voluntary hospitals. Under the Bill, the L.C.C. will lose the great system of municipal hospitals to which it has devoted so much thought and effort. The regional boards appointed by central government are in his opinion no substitute for popularly elected local authorities.

"But what is the position that we face? Existing local government units in the country generally do not coincide with what would be satisfactory units for hospital services. Hospital accommodation over the country is inadequate and is also badly distributed in relation to needs. . . . All persons of good will will agree that if an efficient National Health Service is to be established it must be based upon the provision of hospital facilities for all, with the care and well-being of the patients as the first consideration. With all these considerations in mind the majority party on the London County Council will support the main principles of the Government's proposals as regards taking over all the public hospitals, voluntary and municipal."

Towards Social Security

The Apex of Power

IN a dictatorship the exercise of power, from the top of the official pyramid downwards, is plain. But in a democracy the business is more complex, involving a range of devices and expedients from which clear principles do not easily emerge.

For the conduct of large-scale public enterprises there has been alternating preference for putting responsibility on a single Minister of the Crown and on an independent body. Long ago the uncomfortable duty of supervising the poor-law authorities was placed on a board of commissioners, independent of Parliament or the Government. The time arrived, however, when under the force of public pressure, Members of Parliament could no longer tolerate such remote control; responsibility for supervision (excluding the power to interfere in particular cases) was transferred to a Minister of the Crown. Until 1919, when the Ministry of Health was formed, the person concerned was styled "President of the Local Government Board," though his board never met. When the task of providing public relief—cash payments subject to a means test—became too great to be left as a charge upon local rates, the central government was still unwilling to take upon itself direct responsibility and preferred to set up a separate body called the Unemployment Assistance Board. One of the avowed objects was to take public relief—i.e., National Assistance—out of politics; but an attempt by the board to impose flat-rate scales all over the country on a given day led to such a revolt in Parliament that the Minister of Labour had to intervene by fresh legislation to bring things to a standstill. He found it impossible to resist questions on individual cases from Members of Parliament but he was able somewhat to protect himself from responsibility in his answers by saying "I am informed by the Unemployment Assistance Board that . . ."

To come a stage nearer home it should be recalled that the National Health Insurance Scheme in 1911 was first administered, in each of the four countries, by a body of commissioners. In that experiment, however, the chairman of each commission met under the presidency of a Minister described as the "Chairman of the National Health Insurance Joint Committee" who was himself directly answerable to Parliament. At first, this was a post of some political consequence but later it faded into the background. In 1919 the full responsibility was transferred to the Minister of Health for England and Wales and to the Secretary of State for Scotland.

One of the factors in the method of exercising control is the responsibility for raising the money. It is financial detachment that alone made it possible for the British Broadcasting Corporation to operate in peace-time under an independent board subject only to its charter.

It is against this general background of the comparative responsibilities of a Minister and a board that controversy has arisen over the nationalisation of the coalmining industry. A board is to be set up, but certain special powers are reserved to the Minister of Fuel and Power. Another variant is the organisation of the Post Office, which is run by a board, of which the Postmaster-General is chairman, though in his absence the chief civil servant—designated director-general—

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takes his place. At first, the members of the board (whole-time civil servants) were described as "director" of this and that; there seemed an implication of collective responsibility for the service as a whole. A more recent development, however, has given four of them the title of assistant director-general in the separate fields of services, engineering, finance, and personnel.

When the Beveridge report appeared, some elements in the Government were keen on the amalgamated services for cash benefits being operated by an independent board and not by a Minister. Eventually, a compromise was reached that a Minister should be appointed to get the necessary legislation through Parliament; but it is implicit throughout the National Insurance Bill that he is to remain in office and exercise responsibility in a large field. Some Members of Parliament think that the right channel of communication in case of complaint or difficulty is from a constituent to his local member and thence to the Minister concerned. Much business is already transacted by direct correspondence in this way, and a convention is growing up that a Member should only put down a question for the Minister to answer in the House if he has failed to receive satisfaction within reasonable time by the ordinary channels of personal correspondence. Under war conditions this procedure had great advantage, but care will have to be exercised in days of peace lest the integrity of the administrative machine is impaired by too much short-circuiting. There is to be a National Insurance Advisory Committee to which the Minister is bound to refer draft regulations and to which he may refer other problems for consideration. He seems to expect this committee to be free to formulate advice on problems of their own, but there is no express provision in the Act entitling them to a hearing by an unwilling Minister—if such should ever be appointed.

Many people, while viewing without enthusiasm the exercise of power by a political Minister of the Crown, feel that it is inevitable. On specialist matters he should be buttressed by certain councils and advisory committees through which competent opinion should be able to express itself. If, however, independent powers (such as the right to publish unfavourable reports) were granted to such bodies, then the Minister and his official advisers would be chary of taking such bodies so fully into their confidence as they might otherwise do.

One recalls the man who approved a dictatorship so long as he could be the dictator. Similarly most of us are apt to judge the system of ministerial responsibility by what we happen to think of the particular Minister holding office for the time being. The truth is that he may be as capable of further education as we are, and that much may depend not only on the merits of our submissions but on the circumspection we observe, both publicly and privately, in our presentation of them. JUSTINIAN.

INFECTIOUS DISEASE IN ENGLAND AND WALES

WEEK ENDED MARCH 16

Notifications.—Infectious disease: smallpox, 3 (1 imported case at Liverpool; 1 case at Colchester, 1 at Thurrock); scarlet fever, 1143; whooping-cough, 2006; diphtheria, 475; paratyphoid, 1; typhoid, 6; measles (excluding rubella), 1605; pneumonia (primary or influenzal), 1006; cerebrospinal fever, 65; poliomyelitis, 4; polio-encephalitis, 0; encephalitis lethargica, 3; dysentery, 375; puerperal pyrexia, 134; ophthalmia neonatorum, 60. No case of cholera or typhus was notified during the week.

The number of service and civilian sick in the Infectious Hospitals of the London County Council on March 13 was 1073. During the previous week the following cases were admitted: scarlet fever, 48; diphtheria, 35; measles, 45; whooping-cough, 32.

Deaths.—In 126 great towns there were no deaths from scarlet fever, 1 (0) from an enteric fever, 3 (0) from measles, 6 (0) from whooping-cough, 12 (1) from diphtheria, 72 (8) from diarrhœa and enteritis under two years, and 93 (9) from influenza.

Chester reported the fatal case of enteric fever. There were 12 deaths from diarrhœa and enteritis at Liverpool, 7 at Birmingham. Manchester had 3 deaths from diphtheria.

The number of stillbirths notified during the week was 259 (corresponding to a rate of 33 per thousand total births), including 29 in London.

Parliament

ON THE FLOOR OF THE HOUSE

THE National Health Service Bill was a chief topic of conversation during the week in the lobbies and when the text of the Bill and the white-paper explaining its provisions were available in the Vote Office on Thursday copies were rapidly distributed to M.P.s.

The discussions on the Bill will no doubt be conducted within the framework of party politics. But the differences are not on essentials. The report of the British Medical Association which has been issued to every doctor in the country begins by quoting the Negotiating Committee's statement: "For a quarter of a century the medical profession has stressed the need for a complete health service." The first clause of the Bill says "It shall be the duty of the Minister of Health to promote the establishment in England and Wales of a comprehensive health service designed to secure improvement in the physical and mental health of the people of England and Wales and the prevention, diagnosis and treatment of illness" and to provide the necessary services to achieve these objects.

The Bill lays down the main structure of the service and in the debate on the second reading, which is to be before Easter, and later in committee when details can be considered, there is room for the freest possible debate of a constructive kind. But you cannot, thank Parliamentary common sense, make a real political crisis out of a difference in the interpretation between one side and the other as to how to reach a goal both consider not only desirable but necessary in the national interest.

The pressure of day-to-day work in the House is not slackening and cannot slacken until some of the main difficulties of the switch-over from war to peace have been overcome. Housing is a big obstacle. Deputations go to the Ministry of Health. Committees discuss the difficulties of special areas and work goes on with hindrances and hold-ups all over the land. This week we have had a debate on Scottish housing problems. Conditions in Scotland were so bad before the war that evacuation of the civil population had to be on a much smaller scale than in England because no reception areas could receive more than a few people. And in the debate a member quoted Joseph Chamberlain's words spoken in 1870: "The people of this country . . . are living, if living it can be called, in conditions of squalor, filth and pestilence"—words which are still too true today. Mr. Gallacher, the Communist M.P. for West Fife, spoke of conditions which "were absolutely shocking and a disgrace to Scotland." No Sassenachs Allowed is the order of the day when Scottish measures are considered, and London members did not enter into the debate, but London itself can provide all too many examples of conditions shocking and disgraceful to England. We may have to make arrangements to provide temporary lodging for demobilised men and their families by taking over for emergency housing purposes some large institutions and camps. MEDICUS, M.P.

FROM THE PRESS GALLERY

A Bare Minimum

In the House of Commons on March 18 Mr. MICHAEL FOOT asked for information from the Government on the food situation in Germany. There was, he said, a danger of people imagining that if the ration was kept at 1014 calories all would be well. In his opinion we must aim to get back at least to a ration of 1500 calories, the figure before the last cut. The existing ration in Germany was a third of our ration, and if it fell to 600 or 700 calories it would be only a quarter. It was hard that the British zone should have to bear its whole food burden, because in pre-war days it produced only half of its own requirements, while the Soviet zone produced a surplus. Food should not be used in Europe as a political weapon;

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and he urged for a new effort to allocate food in Europe solely on the basis of human needs.

Mr. J. B. HYND, Chancellor of the Duchy of Lancaster, said that they had had to cut food in the British zone to a basic ration of 1000 calories for the non-worker—the housewife, the old age pensioner, and people of that kind. Rations were graded according to whether one was a medium or heavy worker, an expectant mother, a nursing mother, and so on (see below). They were endeavouring to spread out the available food to the best advantage, but it was obvious that 1000 calories was a dangerous level.

Psychiatrists as Selectors

In the debate in the House of Lords on March 20 on officers' pay and allowances, the Marquess of READING referred to the modern practice of admitting psychiatrists to the discussions of the selection boards. The psychiatrist's opinion was often of great value, but too much importance could be attached to it. The psychiatrist was useful as an adviser, but he ought not to be the directing force behind the decision of a board. As long as he was kept within the four corners of his private field he was of value, but if allowed to wander at large there was some danger that he might become a menace. Lord NATHAN, Under-Secretary of State for War, confirmed the value of the psychiatrist's advice in selecting candidates for commissions. He hoped that they would continue to play their appropriate part in selection.

QUESTION TIME

Medical Man-power

Mr. J. R. LESLIE asked the Minister of Health whether he would consider transferring redundant supernumerary medical men from hospitals to relieve the overwork of doctors in private practice who were unable to obtain assistants to cope with numerous panel patients, particularly in mining areas.—Mr. A. BEVAN replied: I do not accept that there is redundancy in the medical staffing of hospitals. They are required to observe an establishment approved by the Central Medical War Committee; any doctors redundant to that establishment are normally free to transfer to general practice—but I have no powers of direction. Mr. LESLIE: Would the Minister consider whether the supernumeraries would not be serving a more useful purpose in assisting overworked doctors who have a large number of panel patients?

Mr. BEVAN: As I have said, I have no powers of direction, but I hope that under the new National Health Bill we shall have powers which will provide a greater opportunity for redistribution.

University Grants

Mr. D. L. LIPSON asked the Chancellor of the Exchequer what steps he was taking to provide the staff-equipment and accommodation necessary to enable all would-be medical students of satisfactory qualifications to obtain the medical training they needed but were at present unable to obtain owing to the limited facilities available at existing medical schools.

Mr. H. DALTON: The grant-in-aid of universities provides, both last year and this year, £1 million for additional annual grants for medical education and £500,000 for additional annual grants to teaching hospitals. This year's increased grant also includes £2½ million for capital grants to universities, including medical schools. Mr. LIPSON: Will the Minister take steps to find out whether the money is being spent to secure these provisions, in view of the fact that the present shortage of facilities is particularly hard on large numbers of women who want to become doctors but who cannot obtain admission to any medical school?—Mr. DALTON: All I can do is to provide the money. It is not my business to interfere meticulously with how the universities spend it, and I would not propose to do that.

Provision for Pneumoconiosis Patients

Dr. B. STROSS asked the Minister of National Insurance what steps were being taken to provide treatment for cases of pneumoconiosis and with what success.—Mr. E. SHINWELL, Minister of Fuel and Power, replied: Investigations are being made in association with my department by the pneumoconiosis research unit of the Medical Research Council which has been at work for some time. The working party said in their recent report that there is abundant evidence of marked physical and mental improvement among partly disabled persons when found any suitable kind of work; and the research unit in South Wales is engaged on a study of the medical aspects of the industrial and social sides of the problem. This investigation will be developed as the arrangements for providing alternative work expand on the lines recommended by the working party. The clinic is also to investigate the possibilities of direct treatment of the disease, and a special clinic for the purpose, in association with the hospital at Llandough, will soon be in operation. Similar investigations are also to be made amongst tin miners in Cornwall, and amongst the matters for study is treatment by the inhalation of finely powdered aluminium.

Mr. G. THOMAS asked the Minister of National Insurance whether he would state the position of a workman who had been certified to be disabled from pneumoconiosis or silicosis in regard to the benefits to be operative under the new Industrial Injuries Act; whether he was providing for cumulation of compensation on the basis of previous assessments for total or partial compensation, whether he was proposing to alter the method of assessing the degree of their disability; and whether any account would be taken of lump-sum settlements or commutations which had taken place before the present law came into force.—Mr. J. GRIFFITHS replied: Under the provisions of the Industrial Injuries Bill, a workman who before the commencement of the new scheme has been certified to be disabled from pneumoconiosis or silicosis will not be eligible for the benefits of the new scheme in respect of that disability, except that in certain circumstances he may be eligible for an unemployability allowance or a constant attendance allowance. If it should prove possible later on to bring such cases under the new scheme, the terms on which this is to be done would have to be settled in detail, but I am not in a position at present to make any statement with regard to them. I ought to make it clear, however, that cases which have been finally settled could not be brought within such an arrangement.

Rations for Displaced Persons

Replying to a question Mr. J. HYND, the Chancellor of the Duchy of Lancaster, stated that the normal adult displaced person in the British zone in Germany receives a daily ration of 1850 calories. Rations of other displaced persons are as follows: children up to 6 years 1450 calories; children 6–18 years 2150; expectant and nursing mothers 2950; moderately heavy workers 2400; manual heavy workers 2600; and D.P.s in hospital 2300.

Medical Specialists in the Services

Air Commodore A. V. HARVEY asked the Secretary of State for War what was the number of specialists in the three fighting Services who were being retained beyond the date of the release categories owing to lack of replacements; and what had been the response to the appeal by the Central Medical War Committee for offers of service by specialists in civil life who were above military age.—Mr. J. J. LAWSON replied: The most up-to-date figures for the numbers of specialists at present retained beyond the release date for their groups are: Army 17, Navy 7, R.A.F. 60. These figures exclude a small number of specialists who are awaiting replacements due from overseas or who have already been nominated for release. I understand that the C.M.W.C. have up to the present received offers or inquiries from 20 practitioners. These are now being examined by the committee.

Allocation of Doctors between the Services

Mr. R. H. TURTON asked the Minister of Health what was the basis of the allocation between the three Services of doctors newly called up; and whether consideration was given to the fact that R.A.F. medical officers had at present to serve longer than R.A.M.C. officers before obtaining their release.—Mr. C. W. KEY replied: The basis is normally the relative strengths of the three Services in medical officers, though circumstances obtaining when the periodical quotas are fixed may necessitate some departure from it. The Government are, at present, considering the question of adjusting the provisional distribution for the current half year so as to allow an increased intake to the Royal Air Force.

Shortage of Plaster-of-Paris

Sir WAVELL WAKEFIELD asked the Minister of Works if he was aware of the shortage of plaster-of-paris which was required for medical purposes in hospitals; and what steps he was taking to overcome the present shortage.—Mr. G. TOMLINSON replied: The available amount of plaster-of-paris and of other types of plaster is limited by the output of gypsum, and steps are being taken to increase gypsum supplies.

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Letters to the Editor

CONGENITAL DEFECTS FROM GERMAN MEASLES

SIR,—In his letter of March 2 Professor Parsons referred to the figures which I published in the *British Medical Journal* of June 16, 1945. These were the result of a small investigation which I made in regard to rubella during early pregnancy causing defects of ears, eyes, and heart in the child. The number of cases on my files has now increased, and it might be of interest to your readers to have details.

As in my letter of last year, I confine myself to deaf children born in 1940–41 after the rubella epidemic, as I have found it extremely difficult to get full details of symptoms during pregnancy from mothers of older children. The figures are as follows:—

	Boys	*Girls*	*Total*
Deaf children born in 1940–41	64	38	102
History of rubella during first 4 months of pregnancy	16	20	36

Twenty of these cases I have seen, the other 16 having been contacted only by questionnaire. There are a further 6 cases in which, from the symptoms given, I suspect rubella, but it was not diagnosed. I have been unable to get full details of all the children, but in a number of cases there is also a defect of the eyes, and in a few of the eyes and heart. I have the birth weight of 19, the smallest being 3½ and 4½ lb. Fifteen had a birth weight of between 5 and 6½ lb. and 2 of 7½ lb. In a few cases the intelligence has been questioned, but most of those with whom I am dealing at the moment show average, and even above-average, intelligence.

Of the total of 102 children, 40 are left-handed or ambidextrous, 16 of these having left-handedness in the family, and 15 are right-handed but have left-handedness in the family.

Deafness is accounted for in 15 cases by meningitis, and in 8 cases by heredity. The remaining 43, during the first three years of life had: measles (15 cases), whooping-cough (10), pneumonia (9), and bronchitis (8). In 5 cases the child was born with instruments.

There is one case of the mother having had mumps during pregnancy.

SYLVIAN M. MARTIN
Speech Therapist, Infants' Hospital, Vincent Square.
London, S.E.4.

ACHALASIA OF ŒSOPHAGUS

SIR,—In their interesting description of a case of dysphagia following a cranial injury (March 16, p. 381), Dr. Fleminger and Dr. Marion Smith postulate a combined somatic and psychological disorder. Could there be any other conclusion?

Achalasia of the cardia was a term coined by Hurst and used by Rake, who in a meticulous study of post-mortem specimens consistently found a local degeneration of Auerbach's plexus. I doubt whether this would be accepted today as an ætiological picture of the syndrome.

Among about 6000 cases of acute and chronic psychoneurosis in soldiers seen in the past three years, I have met only 2 cases with dysphagia as the primary symptom. One was a youth who had complained of dysphagia and regurgitation as long as he could remember. He had always had a "weak stomach," and as an infant special milk had been procured for him all the way from Scotland, as it was the only food he could digest. He had noticed that his condition was influenced by emotional factors, and he had joined the Army in a long remission. He coped fairly well for a while by eating slowly, but after action he broke down and was invalided as a visceral neurosis. That he was an inadequate immature personality with hysterical features was quite evident, but the history, symptoms, and radiological appearances were diagnostic of achalasia of the cardia. Response to nitrites was poor, but he improved rapidly with a mercury bougie.

The second soldier had unfortunately swallowed a glass of "chianti" proffered by an Italian villager. This turned out to be a caustic, as shown by two œsophageal strictures that developed. Some months later he could still swallow only thickened fluids, and radiography showed a stricture at the lower end of the œsophagus. This partially relaxed with nitrites, and after further reassurance, persuasion, and abreaction, but no bougies, he regained a moderate capacity for eating solids.

The first case illustrates a multidimensional ætiology with psychosomatic influences that would claim much space and time to explain; nevertheless it responded to simple mechanical means. It is the type of case that, followed to autopsy, would show those irreversible micropathological changes so loved by the post-mortem school of medicine (a Rake's progress indeed). The second case is one in which the overriding influence is a gross trauma. Nevertheless restoration of function occurred only after psychiatric treatment. Your contributors' case also illustrates the subtle influences of the psyche in "gross" organic pathology. Surely neither the psyche nor the soma provides the answer; the truth is that, like Litvinoff's peace, the body-mind is indivisible.

London, N.W.8. S. CHARLES LEWSEN.

AUTOPSIES FOR THE CORONER

SIR,—Those of us who are concerned with the efficient fulfilment of the duties of coroners must welcome your leading article of March 16; substantially, it states the somewhat unfortunate position correctly and fairly; from correspondence with my colleagues up and down the country, I have no doubt that there are few areas in which there is not room for improvement in the performance of postmortem examinations made at the order of coroners.

I should like, however, to draw attention to a few further facts. First, I assume that it is thought important to the community that the causes of death, upon which vital statistics are based, should be as nearly accurate as they can be. In 1926 the Coroners (Amendment) Act recognised the importance of a properly conducted postmortem examination in various ways; in some cases of natural death an inquest was made avoidable if a postmortem examination demonstrated that the death was natural, and if there were no other reason for an inquest; in London this method accounts for two-thirds of the cases reported to coroners. At the same time provision was made for specially qualified persons to make special examinations, and for coroners to have the power of sending the body, even out of their own jurisdiction, for postmortem examination elsewhere. These provisions were novelties, and novelties may be the cause of expenses in a new form.

The Act of 1926 was followed by the Departmental Committee upon Coroners in 1936. In their report the committee stressed the importance of a properly conducted postmortem examination, and suggested that there should be a panel of special pathologists, possibly appointed or nominated by the Home Office, who should be called upon to undertake this work for coroners. So far as I know, no such panel has been set up, but in the County of London we are fortunate in having a liberal-minded council, which, long before 1936, arranged for the formation of such a panel of experienced pathologists to whom the London coroners were, and still are, permitted to pay more than the minimum statutory rate for the performance of a postmortem examination and the giving of evidence. I have heard of no such panel elsewhere, though there are, of course, many pathologists of experience and standing who are willing to work for coroners. In this regard the rural districts of the country are badly served.

Much material that would be valuable for teaching purposes can be lost unless active steps are taken in the process of coroner's work. To minimise this loss, it is sometimes possible to enlist the help of the pathologist of a teaching hospital; the ice here tends to be rather thin, and when I first attempted to bring such a plan into operation in my district in 1930 I was met with the argument that the hospital or medical school had, so to speak, bought their pathologist, body and soul, and that he must not do outside work; gradually, I pointed out that it was an illogical arrangement that I should have to move their own cases out from hospital if I wished to have a postmortem examination made by an expert; and I am glad now to be able to say (and I think that this is true more or less throughout London) that the pathologists of the teaching hospitals make postmortem examinations for coroners; in a few cases it is possible for the coroner to send bodies into such hospitals after death elsewhere for postmortem examination. The

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result of this coöperation with the teaching hospitals is to provide many museum specimens that are otherwise exceedingly rare in hospital practice.

In the rural districts, however, the position is very different. The Ministry of Health has power, under the Public Health Act, to cause a local authority to provide a place in which postmortem examinations can be made, but that does not mean that really adequate provision has resulted. I know of complaints at the present time in regard to three counties, in which, it is said, there is either no provision, or only very indifferent provision. This is not the fault of the county council; the coroner who is in charge of a county district looks to the county council for reimbursement of his expenses, but it lies with the local rural authority of the place to provide postmortem facilities; to this end local authorities can combine. Within the framework of the existing law a great deal could be done if all the authorities concerned locally could be made to meet and view the matter jointly. Whether they can be persuaded so to do, I do not know.

Reverting to the opening words of your article, I think that most of us must sympathise with the doctor who took the view that he was unfitted to make a post-mortem examination; what would have been his position if, having made it, he had gone on to a patient in whom puerperal sepsis developed soon afterwards? I agree with you that the coroner must be free to employ whom he chooses; he must not be dependent upon the county pathologist or some other skilled morbid anatomist who is on the salary roll of the county council or some such authority; cases occur every now and then in which absolute impartiality is necessary from the start. In other words, whatever form pathology may take in the new order of things, from the viewpoint of the coroner, as representing the public, there must be independent pathologists of high standing available for the investigation of difficult cases and of routine cases; and their services must be as readily available to a possible defendant as to anyone else.

A general line of policy might be worked out by a conference between representatives of the medical profession, the local authorities (e.g., County Councils Association), the Home Office, and the Coroners' Society (which includes all but about 20 coroners), under the ægis of the Ministry of Health, which has power to enforce improvements.

W. B. PURCHASE
Coroner for the County of London

London, N.W.1

TUBERCULOSIS IN THE CATERING TRADE

SIR,—The Public Health (Prevention of Tuberculosis) Regulations, 1925, prohibit any person who is aware that he is suffering from tuberculosis of the respiratory tract from working in a dairy. Various other prohibitions and penalties are contained in sections of the Public Health Act, 1936, with a view to controlling the spread of notifiable diseases; and under sections 13–16 of the Food and Drugs Act, 1938, various conditions are laid down regarding the handling of food and the cleanliness of those engaged therein. But where tuberculosis is concerned there are many loop-holes in the regulations; for example, it is possible for an innkeeper to employ a tuberculous barmaid, or a restaurateur to employ any number of phthisical cooks or waitresses.

In one saloon bar known to me four barmaids have disappeared in a "cloud of tubercular phlegm" within ten years, and recently I watched one girl, obviously in a highly infective state of pulmonary tuberculosis, serving drinks, cleaning glasses, giving change, and handling meat pies and sandwiches; she coughed and spluttered into her hand when she had nothing else to do. On another occasion I saw a patient with far-advanced phthisis, who had worked to the bitter end as a waitress in a fashionable restaurant. She, no doubt, polished knives and forks by breathing upon them.

A large proportion of those engaged in the food and drink trades come from country parts—especially Ireland and Wales—and they seem peculiarly susceptible to tuberculous infection after taking up work in the cities. They are, no doubt, attracted to the work, among other reasons, by the belief that handling food and drink (especially beer) fattens one. Unfortunately their hours, sleeping accommodation, and living conditions are not always conducive to good health.

Probably pulmonary tuberculosis is rarely spread by contaminated food, but it should be incumbent upon all employers of labour in the catering trade to satisfy themselves that their employees are free from infection—especially tuberculosis—by obtaining from each on engagement, and at twelve-monthly periods, a clean bill of health. Local authorities should have the power to periodically inspect employees, and examine clinically or radiographically all those suspected of harbouring the tubercle bacillus.

For the present, works medical officers have an excellent opportunity of safeguarding their workers by making frequent inspections of their canteen staffs, and keeping an eye on medical certificates sent in by absent canteen workers said to be suffering from bronchial catarrh, anæmia, debility, and other possible early symptoms.

ANDREW V. MAGEE.

Monton, Eccles, Lancs.

MASS RADIOGRAPHY

SIR,—Dr. A. E. Beynon (March 16) states that "medical directors have always been taught, at the Ministry of Health training centre, that a large film should invariably be taken in case of doubt; and a diagnosis is made only from the large film." Yet he says: "I should be interested to know the evidence for Dr. Brailsford's statement that the large film is definitely superior to the miniature radiogram. Is this based on experience?" The answer is Yes, and the evidence he asks for (which could be amply supplemented) has been given by me in previous papers, to which I referred. Might I suggest that, if he cannot recognise the superiority of large films, doubts my ability to do so, and has failed to appreciate the reasons for the instructions regarding them, then perhaps his knowledge and experience are as yet incomplete. The miniature is not a radiograph, nor what he describes as "a real advance in the diagnosis of chest diseases, and especially of early pulmonary tuberculosis." The direct films taken by competent persons in cottage hospitals were, and are still, superior to the best miniature photograph of the screen image. The only features in favour of the miniature are rapidity and reduced cost in dealing with large numbers. Dr. Beynon claims that the accuracy of his observations on miniatures is proved by the fact that, from a total of 46,000, only 2 cases he passed as normal were subsequently found to have tuberculosis. Has he not failed to appreciate the implications of the claim in his two closing paragraphs—namely, that these 46,000 have not been re-radiographed?

> "Finally I am sorry to learn that Dr. Brailsford does not believe in the symptomless minimal tuberculous lesion, for undoubtedly these cases do exist and since there are no physical signs can only be detected by radiography.
>
> "Mass radiography has demonstrated to me its usefulness in the detection of unsuspected disease, especially pulmonary tuberculosis, of which not only early, but sometimes advanced, lesions are found."

Is it not possible that in some of the cases that developed tuberculosis, the patients themselves, and even their doctors, with the normal radiographic reports in mind, may have dismissed the chest complaints as non-tuberculous?

Dr. Beynon sees no reason why 2880 volunteers a day should not be dealt with by each mass unit, and he states that the units do not neglect the clinical history, &c. His confession that the short histories are taken by a clerk indicates the low level to which the official investigation can fall. One has only to scrutinise the case-histories recorded by trained medical students and some housemen to realise how inadequately they can be done. He does not appear to understand the limits of human endurance; clinical and radiographic investigation of 2880 patients a day is unlikely to bear the stamp of efficiency, though the figures may well satisfy an inexperienced official.

The propaganda to the public was that mass radiography of the entire population was contemplated; and that it would lead to eradication of tuberculosis. Such periodical mass examinations, with segregation of all persons showing doubtful shadows (which, in any case, would be impossible) might be considered an expensive preventive measure; but the mere discovery of more cases in certain groups (other than the three I indicated), is no more a preventive measure than would be the

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addition of a few more rods with more attractive bait to clear a lake of fish. Dr. Beynon is right in saying that "the lay public is very ill informed on pulmonary tuberculosis"; for propaganda in science, as I indicated, is not an efficient substitute for truth, and it will ultimately meet the fate it deserves.

Birmingham. JAMES F. BRAILSFORD.

DEHYDRATION IN RHEUMATISM

SIR,—How observations can conflict! In your issue of March 23 Dr. Alan McKenzie claims to have defeated his rheumatism by taking salt. My wife and I are both rheumatic people and have been so for many years. Last June she went on to a salt-low diet for internal ear trouble. To encourage her to persevere I went on the same uninteresting diet. In both of us, despite the damp summer, our rheumatisms disappeared. (Mine closely resembles Dr. McKenzie's.) My wife's still has not reappeared, though mine has; for someone has to eat the bacon, cheese, and corned beef on the ration. However, mine is now mild. We are inclined to relate its disappearance in her case to a salt-low diet, and the partial disappearance in me to a moderated salt intake.

It would be interesting to hear the experience of others on salt-low and salt-high diets respectively. Or is all rheumatism neurotic in origin?

Donhead St. Mary, Shaftesbury. V. H. MOTTRAM.

MILESTONE IN ANÆSTHESIA

SIR,—In your encouraging and cheerful annotation on the use of curarising substances in anæsthesia (March 23, p. 424) three preparations are referred to rather indiscriminately. These are "*d*-tubocurarine chloride," "curarine," and "curare." The first of these is a pure crystalline chemical compound of ascertained formula. The second is an impure alkaloid of uncertain composition (or so, at least, it was when I last met it). The last is the name given to any potent resinous substance issuing from South America and including among its poisonous actions that of neuromuscular paralysis.

It still seems to me unfortunate and dangerous to use these terms synonymously. There are powerful curares scattered throughout the museums of the world, all of them of different strengths and many of them containing a preponderance of alkaloids whose action is that not of *d*-tubocurarine but of strychnine! Anyone who has worked with crude curares must be alarmed at the idea getting round that the many little câches of "curare" which are available can be extracted locally, and, after a few trials of lethal dosage on frog and mouse, passed into anæsthetic currency.

It is therefore incorrect to say that "curare has only one bad effect—in an overdose it arrests respiration." I am not convinced that this statement is true even of impure "curarine," which circulates so freely in this country because it can be extracted directly from the *Strychnos toxifera* of British Guiana. I have seen "curarine" give rise to bronchospasm in animals and man (*Lancet*, 1938, i, 432) and there is at least one other reference to bronchospasm in the literature of the subject (Griffiths, *Ibid*, 1945, ii, 75).

In the widespread application of such a new technique as the use of curariform drugs in anæsthesia it is much safer to work with pure substances. And when you report 1000 safe administrations of *d*-tubocurarine this should not be taken as giving, equally, carte blanche to "curarine" and "curare."

Edinburgh. RANYARD WEST.

"... Any social service, and especially a health service, depends much more upon the personal qualities of the administrators than upon the structure of the mechanism. In this respect an administrative medical service has an excellent foundation because of the individualistic training and outlook of the doctors, who come into an administrative machine later than most. We are apt to look at the case first and the rule second, and may we always continue to do so whatever the future set-up of the administrative machine." Dr. W. S. WALTON, in presidential address to the Midland branch of the Society of Medical Officers of Health, *Public Health*, March, 1946, p. 81.

Obituary

RALPH STOCKMAN

M.D. EDIN., LL.D. GLASG.

Ralph Stockman, who died in Edinburgh on Feb. 27, was born in 1861, the second son of W. J. Stockman, merchant, of Leith. He retired from the regius chair of materia medica and therapeutics in the University of Glasgow in 1936 after holding that appointment with honour and distinction for more than 40 years.

From the Royal High School he went to Edinburgh University where he graduated M.B. in 1882. Abroad he continued his studies at the universities of Vienna and Strasbourg for two years till he returned to Edinburgh to become assistant and later lecturer in the department of materia medica. In 1886 he was awarded a gold medal for his M.D. thesis. To this period belong his important papers on the opium alkaloids, the vegetable astringents, the camphor group of drugs, and the coca alkaloids, but his chief work during his Edinburgh years was on the absorption of iron. Between 1893 and 1897 he published a series of papers which proved conclusively the importance of the nutritional cause of what was then known as chlorosis, and is now called microcytic hypochromic anæmia, and the experience of the last 20 years has in the main confirmed his work.

Anson

In 1897 Stockman went to Glasgow to occupy the university chair of materia medica, and was appointed a visiting physician to the Western Infirmary. There he began what was perhaps his chief contribution to medicine—a prolonged and painstaking investigation on rheumatism. His classical monograph, *Rheumatism and Arthritis*, published in 1920, a model of lucid writing and thinking, helped to clear away the confusion of nomenclature and pathology which had so long existed in this group of diseases. His other work included papers on the pharmacology of iodides, arrow poisons, and myelotoxic substances, and on lathyrism.

During his long tenure of office no man in Glasgow exercised a greater influence on medical education and on successive generations of medical students. His insistence on the basic importance of pre-clinical science led to increased facilities for training in these subjects. A knowledge of the history of medicine, he held, was an essential part of the education of the medical student and he made up for the lack of systematic instruction in this subject by constantly drawing both in lectures and in clinical teaching from his own store of learning.

"To study clinical medicine under Stockman could be a harrowing experience," writes one of his students, "yet there was competition for the limited number of places in his clinic. Under the constant fire of his questions some wilted, but to the less sensitive he offered a sound training and a liberal education. 'Examine the facts and use your common sense' was his dictum. A lazy mind called forth his sharpest satire, as did so-called authority which rested only on pronouncement. His wit, always keen and sometimes barbed, was used with devastating effect on new drugs which did not satisfy his critical mind as being valid. Indeed, many official drugs failed to satisfy Stockman's criteria for therapeutic activity, for he taught during a period when pharmacology was slowly developing and before many active chemotherapeutic agents were available."

"Stockman was no neutral-coloured teacher who sought to appease his pupils," adds D. C. "Looseness of thought, slovenliness of expression, and pretentiousness of manner were anathema to him. Many a Glasgow graduate who chuckled when a fellow student became the target of Stockman's devastating irony, and fumed when it was directed to himself, came later to appreciate

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the lesson it was intended to teach—a love of truth and a hatred of sham and quackery. His lectures were a delight to those who had the mind to seek, and even those who thought them too critical and perhaps even pessimistic could not fail to enjoy the wit and wealth of historical allusion which illumined them. Stockman had clear views as to the place of students in a university. He had little patience with those who imagined that their callow opinions on the great problems of university education or administration were of any value; yet he did his utmost to further the common fellowship of academic life. And his work on the committee of the students' union, where he served as vice-president for many years, was recognised when he retired by the erection of a mural tablet to commemorate a great friend of students."

During his long career Stockman held many appointments. He was an examiner at Oxford and Cambridge, Government visitor to the Pharmaceutical Society, and during the last illness of the late Sir Robert Rait he carried out many of the duties of the principal of the university. In 1937 the university conferred on him the honorary degree of LL.D. Stockman never married, and he is survived by the sister who throughout his life acted as his hostess and companion.

ANDREW MAITLAND RAMSAY

M.D., LL.D. GLASG., F.R.F.P.S.

Dr. A. Maitland Ramsay, who died on March 20 at the age of 86, was the last, and probably the best known of his generation of Glasgow ophthalmologists. Born and bred in Glasgow, he graduated there in 1882, and he spent the whole of his professional life in the city as specialist, consultant, and teacher.

His earliest experience in his specialty was gained as house-surgeon in the Glasgow Eye Infirmary, to the staff of which he was attached before becoming surgeon to the Ophthalmic Institution and ophthalmic surgeon to the Royal Infirmary. These appointments, along with those of university lecturer and ophthalmologist to the Western Infirmary, he held until he retired in 1920. His standing among his colleagues was shown by his election to the presidency of the Ophthalmological Society of the United Kingdom in 1922 and 1923, and he also held the posts of vice-president of the section of ophthalmology of the Royal Society of Medicine and president of the ophthalmic section of the British Medical Association at its Bradford meeting in 1924. He received the honorary degree of LL.D. from Glasgow University in 1923 and was the first recipient of the William Mackenzie medal.

Ramsay was a prolific writer, and among his more important works are *Atlas of the External Diseases of the Eye* (1897) and *Eye Injuries and their Treatment* (1907). *Clinical Ophthalmology for the General Practitioner* (1920) and *The Eye in General Medicine* (1929) were based on postgraduate lectures and on contributions to the proceedings of medical societies. "Although his writings are notable for much originality of thought," A. J. B. points out, "they are even more indicative of his outstanding gifts as a teacher. For many years he was one of the most popular teachers of ophthalmology to undergraduates, and his winter courses of postgraduate lectures attracted large and enthusiastic audiences of both junior and senior practitioners. At a time when ophthalmology tended to become a somewhat narrow specialty, he constantly emphasised its rôle as a part of general medicine, a theme which can be followed in most of his writings. He was a keen admirer of the work of our father in ophthalmology, William Mackenzie, whose influence is evident both in his literary style and in his emphasis on the importance of medical ophthalmology. Even after he retired to St. Andrews Ramsay's mind and pen were busy with the ophthalmic aspects of metabolic disorders and allied subjects."

In 1936 he saw the fulfilment of one of his ambitions in the inauguration of the Tennent chair and institute of ophthalmology in Glasgow; and as an old friend of Dr. Gavin Tennent, and his principal executor, he was largely instrumental in ensuring the devotion of the Tennent bequest to this purpose. Dr. Ramsay married in 1907 Dr. Elizabeth Pace, who survives him.

SIR JAMES BERRY

Professor Grey Turner writes: James Berry's book on *Diseases of the Thyroid Gland*, published 45 years ago, was a model of its kind. It made a great impression and thereafter he was recognised as one of the pioneers in thyroid surgery. Like so many books by young surgical authors, it was based on the essay which brought him the Jacksonian prize at the Royal College of Surgeons. But the essay had been much expanded and he had taken endless pains to widen his knowledge by visits to other hospitals not only in London and the provinces but on the Continent. His example in this respect did a great deal of good and certainly acted as a stimulus to many surgeons who, in those insular days, were made to feel that they ought to go and see what was being done beyond the walls of their own hospitals.

One of his most striking characteristics was the way he combined his love of surgery with his similar fondness for archæology. Even in his very busy years he was always prepared to spare an hour to visit some object of archæological interest or to take friends to one of the museums which he knew intimately. But his antiquarian outings were not in any sense limited and he had more than once made a pilgrimage on foot along the whole length of the Roman wall which stretches right across northern England. This was no mean feat, for he suffered throughout his life from the effects of a paretic disability of the lower limb; but he would never allow that to interfere with his activities, and in his early days he must have ridden thousands of miles on a bicycle both at home and on the Continent. This trait was all in keeping with the way he viewed surgery, for his plan was to go and to see for himself; whether this meant a journey to Finland or Serbia or America made no difference to James Berry.

During his very active work just after the 1914–18 war he gathered young people about him as assistants and visitors in his private practice and his helpers of those days all look back with gratitude to their association with such a master. The care and kindness with which Berry pointed out practical points, the trouble he took, and his rare sharp but kindly rebukes, are warmly recalled because behind it all was his ardent desire to be helpful to those who were treading the path he himself had followed sometimes rather painfully. Having been house-surgeon to Sir Thomas Smith, that great exponent of cleft-palate surgery, it is not surprising that he took an intense interest in the subject. He himself had been a victim, and it was a lifelong effort which enabled him to overcome any remaining disability in speech and a great exhibition of determination that he could deliver lectures and make speeches which were always appreciated and enjoyed by his audiences. It was in his cleft-palate work that his love of precision and accuracy was brought out at its best. The book on *Harelip and Cleft Palate*, which he produced jointly with his old pupil T. P. Legg, who predeceased him, was a splendid monograph and by far the best which had been published. Judged by the standard of those days in this line of work his results were surprisingly good.

In spite of his great reputation in thyroid work and his notable contributions to cleft-palate surgery Berry was always a general surgeon, and it rather annoyed him that anybody should regard him only as a specialist in those subjects. His papers on intestinal injuries and bone tumours were both real contributions to the subjects. All his work was based on a thorough foundation of anatomy, pathology, and clinical experience, and he always insisted on the extreme value of postmortem examinations for the education of the surgeon.

At one time of his life he was an ardent Liberal and sometimes just a little dogmatic in that respect. But as the years passed he became mellowed and towards the end no-one could have been more gentle and serene. His interests and his reading were wide; he was always surrounded with books, none of which were trivial and many profound. He had a great gift for friendship and for hospitality and always took the trouble to invite young men to his home and to functions from which they might gain profit as well as enjoyment. He was very fond of the College of Surgeons and it gave him great satisfaction when he was elected to council at the top of the poll. He was especially interested in the museum and made an admirable chairman of the museum committee.

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Notes and News

THE COMMONWEALTH FUND IN THE NEW AGE

THE studies subsidised by the Commonwealth Fund illustrate the many routes by which the unsolved problems of disease must be approached. The fund's twenty-seventh annual report records a new grant for the study of allergic phenomena which produce pathological changes in animals resembling those of some chronic diseases; another for the observation of endocrine stresses; a third to investigate the possibility that "a specific toxin of cancer occurs in a hereditary pattern"; and a fourth for studying the relation between virus and bacterium in the causation of pneumonia. "In etiology," the report comments, "the easy answers have all been found." The fund has also supported the important technique for early diagnosis of uterine cancer developed by Dr. G. N. Papanicolaou and Dr. H. F. Traut, which is now known to be applicable in the public health service. As an experiment for improving the training of physicians, educational supervisors are to be appointed at two non-teaching hospitals in New York City, to guide the education of house-officers. The fund is also contributing considerably to the advancement of psychiatry, with the special aim of strengthening the link between medicine and psychiatry.

In Great Britain the fund has as usual provided fellowships for psychiatric social workers at the London School of Economics, and has given two additional fellowships for students nominated by the Dutch Federation of Child Guidance Clinics. The fund also contributes to the child-guidance training centre at Woodside Hospital. Under the plan begun in 1925, but suspended in 1941, a maximum of 28 fellows will be appointed in any one year, 20 being ordinary fellows, 5 Service fellows from Government posts in the British Commonwealth, and 3 home Civil Service fellows. Provision has been made for the appointment of several graduates already established in industry or a profession so as to include older men, and the upper age-limit has been raised to 35. The term of fellowships has been reduced to a year, though they may be extended to two years for valid reasons.

THE PIONEER COMES HOME

PECKHAM, the pioneer health centre, was reopened by Lord Geddes on March 23, only two weeks after its release from Government service. The grounds were still littered with reminders of its war-time occupation as a munitions factory, but the building, newly scrubbed by the member-families, was fresh with hope, and showed that none of the old gusto for the enterprise had been lost. Though physically dormant, the centre retained its vitality through the war, and Peckham now emerges as the headquarters of a National Trust for the Study and Promotion of Health, and as the prospective parent of similar centres in other towns, of which Coventry, Winchester, and perhaps Wallasey, will be the first.

RELEASE OF DOCTORS FROM THE ARMY

GENERAL-DUTY medical officers in home and oversea commands are to be released as follows: groups 41–42 during April; groups 43–44 during May; groups 45–47 during June. Specialists of groups 29 and 30 will be released in April, of group 31 in May, and of groups 32 and 33 in June.

HOSPITAL BUILDINGS

THE Ministry of Health has asked local authorities for details of necessary structural improvements in hospitals under their control. It is indicated that little new construction will be possible within the next five years; but it is hoped to undertake modifications, particularly where they will add to the comfort of the nursing and domestic staffs, and thus encourage recruitment.

NEW AMERICAN JOURNALS

THE publication of four new journals in the United States is announced. The *Journal of Colloid Science*, which appeared in January, is intended to have international scope. The purpose of the *Quarterly Review of Pediatrics*, first published in February, is to provide a résumé of progress in the form of abstracts and book reviews. The *Obstetrical and Gynecological Survey*, which also first appeared in February, is planned as an international publication with a similar purpose; subjects of current interest will be comprehensively reviewed from time to time. The first number of *Plastic and Reconstructive Surgery*, to be produced by the American Society of that name, will appear in July.

University of Oxford

The university has gratefully accepted $19,000 from the Rockefeller Foundation for research on antibiotic substances, under the direction of Sir Howard Florey, F.R.S.

University of Manchester

Dr. C. Metcalfe Brown, M.O.H. for Manchester, and Dr. F. N. Marshall, a medical officer of the Ministry of Health, have been appointed lecturers in preventive medicine in the university.

As announced in our last issue, Mr. G. A. G. Mitchell, senior lecturer in anatomy in the University of Aberdeen, has been appointed to the chair of anatomy in succession to Dr. F. Wood Jones, F.R.S.

As an undergraduate at Aberdeen, Mr. Mitchell was awarded two gold medals in anatomy. He graduated M.B. with first-class honours in 1929, and CH.M. (with commendation) in 1933. After holding hospital appointments, he became assistant lecturer, and later lecturer in anatomy at Aberdeen, leaving in 1934 to act as consulting surgeon in Caithness, and returning to teaching in 1937. As a Territorial, he was mobilised in 1939, and served more than five years overseas, in the Middle East, Central Mediterranean, B.L.A., and B.A.O.R.: he worked first as a surgical specialist, was for a time in command of an orthopædic centre, and for eighteen months before he was demobilised as a lieut.-colonel last September he was adviser in penicillin and chemotherapy to 21 Army Group. He was mentioned in despatches, and was awarded the O.B.E. Mr. Mitchell has published numerous papers on the anatomy of the lower back, the spread of intra- and extra-peritoneal effusions, the arrangement of the peripheral parts of the autonomic nervous system, and penicillin therapy.

University of Edinburgh

Mr. Andrew Logan has been appointed university lecturer in thoracic surgery, and thoracic surgeon to the Edinburgh municipal hospitals.

Royal College of Surgeons of Edinburgh

At a reception on March 14, Mr. James M. Graham, the president, conferred honorary fellowship on:

DR. ANDREW DAVIDSON, chief medical officer, Department of Health for Scotland; Mr. EARDLEY HOLLAND, F.R.C.O.G.; Miss FLORENCE HORSBRUGH, late parliamentary secretary to the Ministry of Health; Mr. THOMAS JOHNSTON, late Secretary of State for Scotland; Sir EDWARD MELLANBY, F.R.S., secretary of the Medical Research Council; and Air Marshal Sir HAROLD WHITTINGHAM, late director-general of medical services, Royal Air Force.

The honorary fellowship was also conferred, in absentia, on:

Admiral of the Fleet Viscount CUNNINGHAM OF HYNDHOPE; Brigadier-General ELLIOTT C. CUTLER, professor of surgery at Harvard University; Vice-Admiral Sir SHELDON DUDLEY, F.R.S., late medical director-general of the Navy; Major-General P. R. HAWLEY, late chief surgeon to the American Forces in Europe; Prof. JOHAN HOLST, chief officer to Royal Norwegian Army, Navy, and Air Force Medical Corps; and Sir ALFRED WEBB-JOHNSON, F.R.C.S.

At this formal assembly, the first to be held for seven years, the president, welcoming Mr. J. I. Falconer, lord provost of Edinburgh, recalled the happy relations which have obtained between Town and College since the town council of 1505 yielded to the supplication of the barber surgeons by granting them the "seal of cause," the initial charter, and the foundation of the most ancient of the royal corporations. Miss Horsbrugh, the first woman in the 440 years of the corporation's history to be appointed an honorary fellow, was presented for the distinction by Miss Gertrude Herzfeld, who was the first woman to take her seat as a fellow of the college.

Return to Practice

The Central Medical War Committee announces that Mr. J. H. DOGGART, F.R.C.S., 49, Wimpole Street, W.1, and Mr. BERNARD GLUCK, F.R.C.S., 6, Windsor Place, Cardiff, have resumed civilian practice.

The Smoke Problem

Speaking at the annual meeting of the National Smoke Abatement Society, Sir George Elliston, the newly elected president, pleaded for restriction in the burning of bituminous coal. The incidence of respiratory disease in towns varied, he said, directly with their smokiness. It cost less to construct a house that cannot produce smoke than one that does; and there were signs that the tradition of the fireplace and the chimney was being overcome. The society must continue to press for the replacement of coal by smokeless fuels. With district-piped supplies of heat and hot water, local authorities could provide a standard of comfort rarely attempted in this country, and at a relatively moderate cost. The cost of prohibiting the combustion of raw coal, except in trades where this is essential, would be quickly repaid by better health, reduced corrosive damage to buildings, fabrics, and vegetation, and the brighter appearance of towns.

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Harveian Society of London

The Harveian lecture will be delivered at 5 P.M. on May 27, at the Royal College of Surgeons, by Air Marshal Sir Harold Whittingham, who will speak on Progress of Aviation Medicine in the Royal Air Force, and its Application to Problems of Civil Aviation.

Temperance Collegiate Association

At the annual meeting, to be held at B.M.A. House, Tavistock Square, London, W.C.1, on April 2 at 3.30 P.M., Sir Arthur MacNalty, F.R.C.P., will speak on The Mirage of Alcohol.

Auxiliary Royal Army Medical Corps Funds

The annual general meeting of members will be held at 11, Chandos Street, London, W.1, on April 8 at 5.30 P.M.

Church Missionary Society

During the last five years the society has been surveying the health and welfare of its workers overseas, and it has now decided to appoint a paid part-time woman assistant physician who will work at headquarters in London. Honorary assistant physicians are also to be appointed in provincial centres as health assessors for the missionaries of the society. Further information about these appointments will be found in our advertisement columns.

Operation X-ray

Two radiographic teams are to visit displaced persons' centres in the United States zone of Germany to enable UNRRA to discover and treat incipient cases of tuberculosis and to improve the methods used in advanced cases. Each team will consist of a doctor and three technicians from the International Red Cross, and they will use UNRRA mobile microfilm X-ray units carried in ambulances. UNRRA is also to provide personnel and equipment for six semipermanent tuberculosis microfilm stations in the zone and an X-ray unit for the protection of the health of its own personnel.

Lebanon Hospital for Mental Diseases

Plans for the restoration and development of this hospital will be presented at the 46th annual meeting, to be held at the Caxton Hall, Westminster, London, S.W.1, on Thursday, April 4, at 3 P.M. Sir Harold Satow will preside and the speakers will include Major-General Sir Edward Spears; Canon F. W. Hughes (chaplain-general to the Forces); and Colonel B. G. Wallace (assistant director of medical services, New Zealand Forces). The office of the hospital is at Drayton House, Gordon Street, W.C.1.

Appointment to Glaxo Laboratories

Mr. T. F. Macrae, O.B.E., D.SC., has been appointed director of the research departments of the Glaxo Laboratories Ltd., at Greenford. Dr. Macrae became adviser in nutrition to the Royal Air Force in 1935, when he was working at the Lister Institute. During the war he has served with the rank of wing-commander and he has since been appointed civilian consultant.

The Pocket Medical Dictionary, compiled by Sister Lois Oakes, with the assistance of Prof. T. B. Davie, is now in its seventh edition. Measuring 5 in. by 4 in., it really can be slipped conveniently into a small pocket, and it contains, besides the vocabulary, many diagrams and some useful sections on tray-laying, first-aid, gas warfare, poisons, examination of urine and fæces, and dietary schemes for adults and children. Published by Livingstone, of Edinburgh, price 4*s*.

Appointments

DEVILLE, P. M., M.R.C.P.: temp. asst. physician, dermatological dept., Southend General Hospital.
HAMILTON, WINIFREDE M., M.R.C.S., D.P.H.: temp. asst. M.O.H. and asst. school M.O. for the East Riding of Yorkshire.
KELLY, B. M., M.B. Dubl.: temp. asst. M.O.H. for Great Yarmouth.
Colonial Medical Service.—The following appointments are announced:—
BROHIER, E. S., L.R.C.P.E.: M.O. (special grade), Ceylon.
CLARKE, F. J., L.R.C.P.E.: D.M.O., St. Lucia, Windward Islands.
COGHLAN, B. A., M.D. N.U.I., D.T.M.: senior M.O., Uganda.
LEACOCK, A. G., M.B. Camb., F.R.C.S.: asst. surgeon, public hospital, Georgetown, British Guiana.
MCGREGOR, A., M.B.: M.O., Tanganyika.
MORLEY, A. H., M.B. Leeds, F.R.C.S.E.: surgical specialist, Tanganyika.
SMITH, W. H., M.B. Dubl., D.P.H., D.T.M.: senior officer, Kenya.
WILKINSON, WALLACE, M.R.C.S., D.T.M. & H.: senior M.O., Kenya.
WILSON, D. B., M.D. Camb., D.T.M. & H.: malarial specialist, Tanganyika.
The following factory surgeons have been announced:—
BROWNE, S. N., M.B. Birm.: Dawley, Salop.
DE LACEY, GERALD, F.R.C.S.: Burgess Hill, Sussex.
KNIGHT, F. H. K., M.R.C.S.: Swansea, Glam.
LANGLANDS, G. C., M.B. Glasg.: Pollokshaws, Lanark and Refrew.
PEARSON, C. W., M.B. N.U.I.: Gainsborough, Lincoln.

Medical Diary

MARCH 31 TO APRIL 6

Monday, 1st

ROYAL COLLEGE OF SURGEONS, Lincoln's Inn Fields, W.C.2
5 P.M. Sir Heneage Ogilvie: Inguinal Herniæ.

Tuesday, 2nd

ROYAL SOCIETY OF MEDICINE, 1, Wimpole Street, W.1
5 P.M. *Orthopædics.* (Cases at 4 P.M.)

Wednesday, 3rd

ROYAL COLLEGE OF SURGEONS
5 P.M. Prof. John Morley: Surgery of the Stomach.
ROYAL SOCIETY OF MEDICINE
2.30 P.M. *History.* Dr. A. P. Cawadias: History of Eunuchism.
8 P.M. *Surgery.* Mr. T. M. J. d'Offay: Surgical Treatment of the Ampulla-papillary Region and of the Head of the Pancreas. Mr. Andrew Monro: Aseptic (closed) Anastomosis. Mr. Rodney Maingot: Gastrectomy (film).
UNIVERSITY OF GLASGOW
8 P.M. (Department of Ophthalmology.) Prof. W. J. B. Riddell: Industrial Ophthalmology.

Thursday, 4th

ROYAL COLLEGE OF SURGEONS
5 P.M. Mr. R. Maingot: Surgery of the Spleen.
ROYAL SOCIETY OF MEDICINE
8.45 P.M. *Neurology.* (National Hospital, Queen Square, W.C.1.) Clinical meeting. Cases at 8 P.M.
MEDICAL SOCIETY OF THE L.C.C. SERVICE
3 P.M. (St. James' Hospital, Balham, S.W.12.) Clinical meeting.

Friday, 5th

ROYAL SOCIETY OF MEDICINE
5.30 P.M. *Anæsthetics.* Air Commodore R. R. Macintosh: Anæsthetics for Abdominal Surgery.
ROYAL INSTITUTION OF GREAT BRITAIN, 21, Albemarle Street, W.1
5.15 P.M. Sir Edward Mellanby, F.R.S.: Medical Research in War and Peace.

Saturday, 6th

MEDICAL SUPERINTENDENTS' SOCIETY
2.30 P.M. (The Retreat, York.) Annual general meeting.

Births, Marriages, and Deaths

BIRTHS

BEDWELL.—On March 22, at Twickenham, the wife of Surgeon Lieutenant G. A. Bedwell, R.N.V.R.—a daughter.
BOWEN.—On March 15, at Barry, Glam., the wife of Mr. J. G. Bowen, F.R.C.S.—a son.
D'ABREU.—On March 17, in London, the wife of Mr. Frank d'Abreu, F.R.C.S.—a son.
JOHNSTON.—On March 10, the wife of Dr. Colin M. Johnston—a son.
MCCANN.—On March 17, at Clapham, the wife of Dr. John McCann—a daughter.
MACLENNAN.—On March 19, at Glasgow, the wife of Dr. Hector MacLennan—a son.
MAGNUS.—On March 21, in London, the wife of Dr. H. A. Magnus—a son.
MORONEY.—On March 21, the wife of Mr. P. B. Moroney, F.R.C.S., of Blundellsands—a daughter.
PRATT.—On March 16, at Chichester, the wife of Surgeon Commander C. L. G. Pratt, O.B.E., R.N.V.R.—a daughter.
WENGER.—On March 14, in Edinburgh, Dr. Margaret Wenger (née Dow), wife of Mr. R. A. L. Wenger, F.R.C.S., of Carluke—a son.

MARRIAGES

PRAGNELL—WINDUST.—On March 12, in Sunbury, Cyril Pragnell, surgeon lieutenant R.N.V.R., to Mary Windust.

DEATHS

ADAMS.—On March 19, at Newbury, Evelyn George Beadon Adams M.B. Lond., F.R.C.S., aged 76.
BUNTING.—On March 15, at Southampton, Dora Elizabeth Lidgett Bunting, M.D. Lond.
CARVER.—On March 17, at Torquay, Arthur Edmund Carver, M.D. Camb., M.R.C.P.
COLE.—On March 19, at Worthing, Percival Courtenay Cole, M.B. Lond.
COUTTS.—On March 18, Francis James Coutts, M.D. Lond., F.R.C.S.E., of Wallwood Road, London, E.11, aged 79.
CRAWFORD.—On March 14, John Crawford, M.D. Glasg., of Ealing.
HAINES.—On March 21, at Ringwood, Frederick Haselfoot Haines, M.R.C.S., D.P.H., aged 82.
HILLMAN.—On March 16, at Hambledon, Oscar Stanley Hillman, M.S., F.R.C.S., aged 50.
KEYS.—On March 21, Sydney Hudson Keys, M.R.C.S., of Ruislip, Middlesex.
MEARNS.—On March 22, at Tunbridge Wells, Alexander Mearns, M.B. Edin., D.P.H., D.T.M. & H., major R.A.M.C., retired.
MOULD.—On March 15, Gilbert Edward Mould, M.R.C.S.
RAMSAY.—On March 20, at St. Andrews, Andrew Maitland Ramsay, M.D., LL.D. Glasg., aged 86.
SIMPSON.—On March 21, Alexander Malcolm Simpson, M.B. Camb., D.P.H., of Portland Place, W.1.

Dr. HORACE EVANS has been appointed physician to Queen Mary in succession to the late Lord Dawson of Penn.

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May 26 '47
Nov 9 '49
Nov 22 '49
Nov 19 '51
Jun 22 '53
Sep 22 '53

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